CHAPTER 8

POWER DEVELOPMENT PLAN

CHAPTER 8 POWER DEVELOPMENT PLAN

INPUT DATA for ESPRIT (Chapter-8)

TABLE 2.1.1 PARAMETER OF EXISTING POWER PLANTS OF NORTH

		NO.				HEAT	RATE *)	FUEL	COST	FAST				0&	м
	PLANT	OF	PLANT	CAPA	BASE					SPIN		SCHL	MAIN		*
101	NAME	UNIT	ТҮРЕ	CITY	LOAD	BASELOAD	INCR'TAL	DMSTIC	FORGN	RES.	FOR	MAIN	CLAS	FIXED	VAR
				(MW)	(MW)	(KCAL/	/KWH)	(\$7)	KCAL)	(%)	(%)	(DAYS)	(MW)	(\$/KW/M)	(\$/MWH
1	HTHAC BA	1	HYDR	108	11	0	0	0.0	0.0	0	0.5	0	0	0.0	0.0
2	HHOA BIN	1	HYDR	1920	192	0	0	0.0	0.0	0	0,5	0	0	0.0	0.0
3	CNINH BI	4	ÇOAL	25	8	4870	4090	4,54	0.0	5	20.0	50	25	1.1	6.3
4	CUONG BI	2	COAL	50	16	4214	3540	4.54	0.0	5	20.0	50	50	1.1	6.3
5	ÇPHA LAI	4	COAL	110	38	3541	3001	4.54	0.0	6	15.0	50	100	0.9	5.0
6	CPHA LAB	0	COAL	300	105	2600	2400	4.54	0.0	. 6	8.0	40	300	0.3	1.4
7	GTHAI BI	2	GAST	14	5	5810	4395	4.76	0.0	ō	10.0	40	14	0.2	9.1

TABLE 2.1.2 PARAMETER OF EXISTING POWER PLANTS OF SOUTH

	· _	NO.					RATE *)	FUEL		FAST		¢ o U U		0&	м
NO.	PLANT NAME			CITY		BASELOAD (KCAL		DMSTIC	FORGN	SPIN RES. (%)	FOR (%)	MAIN	MAIN CLAS (MW)	FIXED (\$/KW/M)	VAR (\$/MWH
1	HDA NHIM		HYDR	160	16	0	0	0.0	0.0	 0	0.5	0	0	0.0	0.0
2	HTRI AN	1	HYDR	400	40	0	0	0.0	0.0	0	0,5	0	. 0	0.0	0.0
3	HTHAC MO	0	HYDR	150	15	0	0	0.0	0.0	0	0.5	0	o	0.0	0.1
4	ННАМ/ДАМ	· 0	HYDR	472	47	0	0	0.0	0.0	0	0.5	0	· 0	0.0	٥.
5	LPHU MYL	0	LNGP	200	60	2450	2040	7.49		6	7.0	30	200	0.4	2,
6	OCAN THO	1	OILE	33	10	3250	2785	7.49	0.0	6	6.0	20	30	0.5	2.
7	OTHU DU1	1	OILE	33	10	3098	2634	7.49	0.0	6	6,0	30	30	0.5	2.
8	OTHU DU2	2	OILE	66	10	3098	2634	7.49	0.0	6	6.0	30	50	0.5	2.
9	GTHU DGO	1	GAST	33	7	4210	3285	7.49	0.0	8	10.0	40	33	0.2	9.
10	GTHU DGN	2	GAST	32	10	3630	2180	7.49	0.0	6	6.0	· 30	30	0.2	9.
11	GBARIA O	2	GAST	15	7	4145	3140	7.49	0.0	8	10,0	40	15	0.2	9.
12	GBARIA N	2	GAST	32	10	3630	2180	7.49	0.0	6	6,0	30	32	0.2	9.
13	DDIESEL2	1	DSEL	78	0	3000	2800	7.49	0.0	8	10.0	20	20	0.4	3.
14	GAS C/C1	0	COM8	400	100	1911	1800	7.94	0.0	8	6.0	35	400	0.3	4.
15	GAS C/C2	· 0	COMB	200	100	1911	1800	7.94	0.0	8	6.0	35	200	0.3	4.

TABLE 2.1.3 PARAMETER OF EXISTING POWER PLANTS OF CENTER

		NO.					RATE *)							08	м
	PLANT	OF	PLANT	САРА	BASE					SPIN		SCHL	MAIN		
NO.	NAME	UNIT	TYPE	CITY	LOAD	BASELOAD	INCR'TAL	DMSTIC	FORGN	RES.	FOR	MAIN	CLAS	FIXED	VAR
· · ·	· .			(พพว่	(MW)	(KCAL	/KWH)	(\$/	KCAL)	(%)	(%)	(DAYS)	(MW)	(\$/KW/M)	(\$/MWH)
1	HSMALL	1	HYDR	19	2	0	. 0		0.0	0	0.5	0	0	0.0	0.0
2	HVINH SO	0	HYDR	66	7	0	0	0.0	0.0	0	0.5	0	0	0.0	0.0
3	HYAR112	0	HYDR	360	35	• •	· 0	0.0	0.0	0	0.5	0	0	0.0	0.0
4	HYARI34	0	HYDR	360	35	0	0	0.0	0.0	0	0.5	0	• 0	0.0	0.0
S	HSONG HI	0	HYDR	70	7	0	0	0.0	0.0	٥	0,5	0	٥	0.0	0.0
6	DDIESEL3	. 1	DSEL.	177	0	3000	2800	15.00	0.0	6	10.0	20	. 20	0.4	3.5
7	DDIESEL4	0	DSEL	300	0	3000	2800	15.00	0.0	. 6	10.0	20	20	0.4	3.5

INPUT DATA for ESPRIT (Chapter-8)

TABLE 3.1.1 PARAMETER OF CANDIDATE POWER PLANTS OF NORTH

		NO.				HEAT	RATE *)	FVEL (COST	FAST				0 &	м	
٥,		UNIT	TYPE	CITY	LOAD	BASELOAD	INCR'TAL	DMSTIC	FORGN	RES,	FOR	MAIN	CLAS	FIXED	VAR	YEAR
	HBAN				 F A											2002
+ +		1			50	0	0	0.0	0.0	0	0.0	v		0.0	0.0	
2	HDAI	1	. 11108	250	25	0	0	0.0	0.0	0	0.0	0	Ň	0.0	0,0	
3	HCUA	1	HTDR	105	10	0	U	0.0	0.0	0	0.0	0	0	0.0 0.0 0.0 0.0	0.0	2003
4	HSON	1	HTUR	480	48	. 0	0	0.0	0.0	0	0.0	0	0	0.0	0.0	2007
5	HSON	1	HYOR	480	48	0 0 0 0 0	0	0.0	0.0	U	0.0	0	Ŷ	0.0	0.0	2008
6	HSON	1	HYDR	480	48	0	0	0.0	0.0	٥	0.0	0	0	0.0		
7	HSON	1	HYDR	480	48	0	0	0.0	0.0	0	0.0		. 0		0.0	2010
9	HSON	1	HYDR	480	48	0	0 0 2400	0.0	0.0		0.0	0	0	0.0		2011
۶÷	CQUA	1	COAL	300	105	2529	2400	4.54	0.0	6	8.0	95	300	0.7	4.0	2000
S	кнол		HYDR	400	40	0	0	0.0	0.0		0.0					2012
ĩ	ннои	1	HYDR	400	40	٥	0	0.0	0.0	0	0.0	0	0	0.0	0.0	2013
٩B	LE 3.1.	2 P	ARAME	TER O	CAN	DIDATE PO								• •		
		NO.					RATE *)									
	PLANT	OF	PLANT	CAPA	BASE	HEAT				SPIN		SCHL	MAIN			AVAI
۰.	NAME	UNTI	TYPE	CITY	LOAD	BASELOAD	INCR' TAL	DMSTTC	FORGN	RES.	FOR	MATN	CÍAS	FIXED	VAR	YFAR
				(MW)	(MW)	(KCAL	(KWH)	(\$/	KCAL)	(%)	(%)	(DAYS)	(MW)	(\$/KW/M)	(\$/MWH)	
L	HDAI	1	HYDR	300	30	0	0	0.0	0.0	· 0	0.0		0	0.0	0.0	2003
ŝ	HDON	1	HYDR	200	20	0	0	0.0	0.0	0	0:0	·	ò	0.0	0.0	2004
3	NEW	3	COMB	300	100	1911	1800	7.94	0.0	. Ř	6.0	55	300	0.3	4.0	2000
4	NEW+	í	COAL	300	100	0 0 1911 2529	2400	8.22	0.0	8	6.0	95	300	0.7	4.0	2008
	·															
															1. A.	
		.3 P	ARAME	TER O	F CAN	DIDATE PO	ER PLANT	S OF CE	NTER			- 				
AB	LE 3.1															
A B	ILE 3.1															
A E		NO.				HEAT	RATE *)	EUEL	COST	FAST			1.1	0 &	м	
	PLANT	OF	PLANT	САРА	BASE	HEAT	RATE *)	FVEL	COST	FAST. SPIN		SCHL	MAIN			AVAIL
	PLANT	OF	PLANT TYPE	CITY	BASE LOAD	HEAT	RATE *)	FUEL	COST Forgn	FAST SPIN RES.	FOR	SCHL	MAIN	FTYED	VAP	YEAR
• -	PLANT	OF	PLANT F TYPE	CITY (MW)	BASE LOAD (MW)	HEAT	RATE *) INCR'TAL (KWH)	FUEL DMSTIC (\$/	COST FORGN KCAL)	FAST SPIN RES, (%)	FOR (%)	SCHL MAIN (DAYS)	MAIN CLAS (MW)	FIXED (\$/KW/M)	VAP	YEAR
 0,	PLANT NAME HSE	OF UNIT	PLANT TYPE	CITY (MW)	BASE LOAD (MW)	HEAT BASELOAD (KCAL	RATE *) INCR'TAL /KWH)	FUEL DMSTIC (\$/	COST FORGN KCAL)	FAST SPIN RES, (%)	FOR (%)	SCHL MAIN (DAYS)	MAIN CLAS (MW)	FIXED (\$/KW/M)	VAR (\$/MWH)	YEAR
). L	PLANT NAME	OF UNIT	PLANT TYPE	CITY (MW)	BASE LOAD (MW)	HEAT BASELOAD (KCAL	RATE *) INCR'TAL /KWH)	FUEL DMSTIC (\$/	COST FORGN KCAL)	FAST SPIN RES, (%) 0 0	FOR (%) 0.0 0.0	SCHL MAIN (DAYS) 0	MAIN CLAS (MW) 0	FIXED (\$/KW/M) 0.0 0.0	VAR (\$/MWH) 0,0	2002
 L 2	PLANT NAME HSE	OF UNIT	PLANT TYPE	CITY (MW)	BASE LOAD (MW)	HEAT BASELOAD (KCAL	RATE *) INCR'TAL /KWH)	FUEL DMSTIC (\$/	COST FORGN KCAL)	FAST SPIN RES, (%) 0 0	FOR (%) 0.0 0.0	SCHL MAIN (DAYS) 0	MAIN CLAS (MW) 0	FIXED (\$/KW/M) 0.0 0.0	VAR (\$/MWH) 0,0	2002
) . 	PLANT NAME HSE HBUO	OF UNIT	PLANT TYPE	CITY (MW)	BASE LOAD (MW)	HEAT BASELOAD (KCAL	RATE *) INCR'TAL /KWH)	FUEL DMSTIC (\$/	COST FORGN KCAL)	FAST SPIN RES, (%) 0 0	FOR (%) 0.0 0.0	SCHL MAIN (DAYS) 0	MAIN CLAS (MW) 0	FIXED (\$/KW/M) 0.0 0.0	VAR (\$/MWH) 0,0	2002 2002 2002
 	PLANT NAME HSE HBUO HSE	OF UNIT	PLANT TYPE	CITY (MW)	BASE LOAD (MW)	HEAT BASELOAD (KCAL	RATE *) INCR'TAL /KWH)	FUEL DMSTIC (\$/	COST FORGN KCAL)	FAST SPIN RES, (%) 0 0	FOR (%) 0.0 0.0	SCHL MAIN (DAYS) 0	MAIN CLAS (MW) 0	FIXED (\$/KW/M) 0.0 0.0 0.0	VAR (\$/MWH) 0,0	YEAT 2002 2002 2002
 1 2 3 4 5	PLANT NAME HSE HBUO HSE HPLI HAN	OF UNIT 1 1 1 1	PLANT TYPE HYDR HYDR HYDR HYDR HYDR	CITY (MW) 220 81 366 120 116	BASE LOAD (MW) 22 8 40 12 12	HEAT BASELOAD (KCAL. 0 0 0 0 0 0 0	RATE *) INCR'TAL /XWH) 0 0 0 0 0 0 0	FUEL DMSTIC (\$/ 0.0 0.0 0.0 0.0 0.0	COST FORGN KCAL) 0.0 0.0 0.0 0.0 0.0	FAST SPIN RES. (%) 0 0 0 0 0 0	FOR (%) 0.0 0.0 0.0 0.0 0.0	SCHL MAIN (DAYS) 0 0 0 0 0	MAIN CLAS (MW) 0 0 0 0 0	FIXED (\$/KW/M) 0.0 0.0 0.0 0.0 0.0 0.0	VAR (\$/MWH) 0.0 0.0 0.0 0.0	YEAF 2002 2002 2002 2004
 0. 23 45 6	PLANT NAME HSE HBUO HSE HPLI HAN HSON	OF UNIT 1 1 1 1	PLANT TYPE HYDR HYDR HYDR HYDR HYDR HYDR	CITY (MW) 220 81 366 120 116 60	BASE LOAD (MW) 22 8 40 12 12	HEAT BASELOAD (KCAL. 0 0 0 0 0 0 0	RATE *) INCR'TAL /XWH) 0 0 0 0 0 0 0	FUEL DMSTIC (\$/ 0.0 0.0 0.0 0.0 0.0	COST FORGN KCAL) 0.0 0.0 0.0 0.0 0.0	FAST SPIN RES. (%) 0 0 0 0 0 0	FOR (%) 0.0 0.0 0.0 0.0 0.0	SCHL MAIN (DAYS) 0 0 0 0 0	MAIN CLAS (MW) 0 0 0 0 0	FIXED (\$/KW/M) 0.0 0.0 0.0 0.0 0.0 0.0	VAR (\$/MWH) 0.0 0.0 0.0 0.0 0.0	YEAR 2002 2002 2004 2004 2004
 1 2 3 4 5	PLANT NAME HSE HBUO HSE HPLI HAN	OF UNIT 1 1 1 1 1 1 1	PLANT TYPE HYDR HYDR HYDR HYDR HYDR	CITY (MW) 220 81 366 120 116 60 80	BASE LOAD (MW) 22 8 40 12 12 12 6 8	HEAT BASELOAD (KCAL, 0 0 0 0 0 0 0 0	RATE *) INCR'TAL (XWH) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FUEL DMSTIC (\$/ 0.0 0.0 0.0 0.0 0.0 0.0 0.0	COST FORGN KCAL) 0.0 0.0 0.0 0.0 0.0	FAST SPIN RES, (%) 0 0 0 0 0 0 0 0	FOR (%) 0.0 0.0 0.0 0.0 0.0	SCHL MAIN (DAYS) 0 0 0 0 0 0 0 0 0 0 0 0	MAIN CLAS (MW) 0 0 0 0 0	FIXED (\$/KW/M) 0.0 0.0 0.0 0.0 0.0 0.0	VAR (\$/MWH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	YEAR 2002 2002 2004 2004 2004 2005 2005

INPUT DATA for ESPRIT (Chapter-8)

TABLE 1.1.1 CHRONOLOGICAL LOAD CURVE (MW) OF NORTH

							TIME	(H)					
(EAR	PERIOD	1	2	3	4	5	6	7	8	9	10	11	12
		13	14	15	16	17	18	19	20	21	22	23	24
1993	1	366	363	363	363	413	5\$3	620	604	598	623	660	595
		519	S34	547	569	690	865	957	881	760	628	430	392
	2	381	377	375	383	451	539	526	540	560	615	644	578
		527	537	548	561	637	715	913	883	794	696	482	415
	3	553	538	526	524	548	604	596	625	676	732	772	715
		676	676	685	694	741	791	1015	998	912	824	651	614
	4	384	382	381	383	470	595	589	594	603	637	662	583
		521	554	581	598	743	1077	1028	956	802	688	446	407
1994	1	393	389	389	389	443	593	665	648	642	668	708	634
		557	573	587	611	740	928	1027	945	815	674	461.	42
	2	409	405	402	411	484	578	564	579	601	660	691	620
		565	576	588	602	684	767	980	947	852	747	517	44
	3	593	577	564	562	588	648	640	671	725	785	828	76
		725	725	735	745	795	849	1089	1071	979	884	699	65
	4	412	410	409	411	504	638	632	637	647	684	710	62
		559	594	623	642	797	1156	1103	1026	861	738	479	431

TABLE 1.1.2 CHRONOLOGICAL LOAD CURVE (MW) OF SOUTH

							TIME	(H)					
YEAR P	ERIOD	1	2	3	4	5	6	7	8	9	10	11	12
	•	13	14	15	16	17	18	19	20	21	22	23	24
1993	1	357	357	350	357	392	455	413	448	490	490	525	434
		427	469	469	511	539	700	679	623	609	560	441	357
	2	400	400	400	400	465	458	408	472	479	529	536	472
		465	429	486	501	529	565	715	679	651	615	515	408
	3	413	413	383	390	428	465	450	503	578	570	555	480
		488	525	540	540	540	570	750	720	713	645	495	443
	4	417	409	409	417	458	531	482	523	572	572	621	507
		498	547	547	596	629	817	792	727	711	654	515	417
1994	1	419	419	411	419	460	534	484	526	575	575	616	509
	· .	501	550	550	599	632	821	796	731	714	657	517	419
	2	469	469	469	469	545	537	479	554	562	621	629	554
		545	503	570	588	621	663	839	796	764	721	604	479
	3	484	484	449	457	502	545	528	590	678	669	651	563
	*	572	616	633	633	633	669	880	845	836	757	581	520
	· 4	489	480	480	489	537	623	565	613	671	671	728	595
		584	642	642	699	738	958	929	853	834	767	604	489

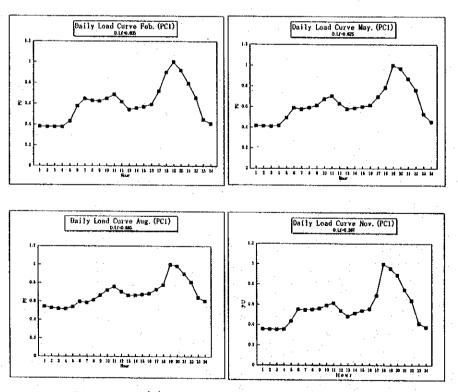
TABLE 1.1.3 CHRONOLOGICAL LOAD CURVE (MW) OF CENTER

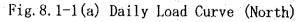
							TIME	(H)					
YEAR	PERIOD	1	2	.3	4	5	6	.7	8	9	10	11	12
	·	13	14	15	16	17	18	19	20	21	22	23	24
1993	1	70	63	61	61	. 66	. 75	95	83	92	85	88	90
		74	75	80	84	88	92	136	160	148	121	109	78
	2	68	65	66	66	75	77	81	88	87	88	87	82
· · ·	3	83	83	86	88	92	110	145	137	128	108	92	77
	3	106	104	102	102	109	110	108	112	113	116	118	112
		107	115	114	115	117	129	189	168	154	141	115	106
	4	58	58	58	59	71	83	74	76 :	79	84	85	73
		71	82	83	83	97	153	156	146	126	106	71	60
1994	1	.87	. 78	76	76	82	93	118	103	114	106	109	112
	· · · ·	92	93	100	104	109	114	169	199	184	151	136	97
	2	85	81	82	82	93	96	101	109	108	109	108	102
1		103	103	107	109	114	137	180	170	159	134	114	96
	3	132	129	127	127	136	137	134	139	141	144	147	139
		133	143	142	143	146	160	235	209	192	175	143	132
	4	72	72	72	73	88	103	92	95	98	104	106	91
	1.1.1.1.1.1.1.1.1	88	102	103	103	121	190	194	182	157	132	88	75

Demand at Generation end JICA (Base)

TABLE 1.2.1 ANNUAL LOAD OF NORTH

							LOAD
EAR	PEAKLOAD		MIN.LOAD	GR,RATE	ENERGY		
	(MW)	(%)	(MW)	(%)	(GWH)	(%)	(%)
993	1077.0	-	363.0	-	5376.3	-	56.99
994	1155.6	7.3	389.5	7.3	5768.7	7.3	56.99
995	1240.0	7.3	417.9	7.3	6189.9	7.3	56.99
996	1278.0	3.1	456.0	91	6599.3	6.6	58.95
997	1386.6	8,5	494,8	8.5	7160.2	8.5	58.95
998	1504.5	8.5	536.8	8.5	7768.8	8,5	58.95
999	1632.4	8.5	582.4	8.5	8429.2	8.5	58.95
000	1771.1	8.5	632:0	8.5	9145.7	8.5	58.95
001	1991.0	12.4	710.0	12.4	10279.7	12.4	58.94
002	2223.9	11.7	793.1	11.7	11482.4	11.7	58.94
003	2484.1	11.7	885.9	11.7	12825.8	11.7	58.94
004	2774.8	11.7	989.5	11.7	14326.5	11.7	58.94
005	3099.4	11.7	1105.3	11.7	16002.7	11.7	58.94
2006	3320.0	7.1	1268.0	14.7	17874.0	11.7	61.40
007	3668.6	10.5	1401.1	10.5	19750.7	10.5	61.46
008	4053.8	10.5	1548.3	10.5	21824.6	10.5	61.40
:009	4479.4	10.5	1710.8	10.5	24116.1	10.5	61.40
010	4949.8	10.5	1890.5	10,5	26648.3	10.5	61.40
2011	5287.0	6.8	2019.0	6,8	28460.3	6.8	61.4
2012	5842.1	10.5	2231.0	10.5	31448.7	10.5	61.4
2013	6455.6	10.5	2465.2	10.5	34750,8	10.5	61.4
VRG.		9,4		10.1		9.8	



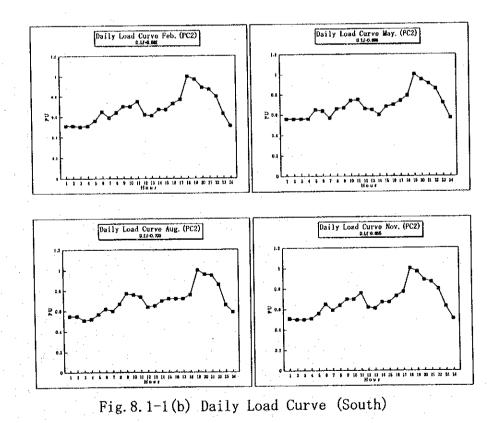


Demand at Generation end JICA (Base)

TABLE 1.2.2 ANNUAL LOAD OF SOUTH

100 N

							LOAD
'EAR	PEAKLOAD	GR.RATE	MIN.LOAD	GR.RATE	ENERGY	GR.RATE	FACTO
	(MW)	(%)	(MW)	(%)	(GWH)	(%)	(%
993	817.0		350.0		4507.2		62.9
994	958.3	17.3	410.5	17.3	5286,9	17.3	62.9
995	1124.1	17,3	481.6	17.3	6201.6	17.3	62.9
996	1276.0	13,5	547.0	13.6	7047.5	13.6	63.0
997	1443.2	13,1	618.7	13.1	7970.7	13.1	63.0
1998	1632,2	13.1	699.7	13.1	9014.9	13.1	63.0
1999	1846.0	13.1	791.4	13,1	10195.9	13.1	63.0
2000	2087.9	13.1	895.0	13.1	11531.5	13.1	63.0
2001	2358.0	12.9	1009.0	12.7	12997.4	12.7	62.9
2002	2645.7	12.2	1132.1	12.2	14583.1	12.2	62.9
2003	2968.4	12.2	1270.2	12.2	16362.2	12.2	62.9
2004	3330.6	12.2	1425.2	12.2	18358.4	12.2	62.9
2005	3736.9	12.2	1599.1	12.2	20598.1	12.2	62.9
2006	4140.0	10.8	1772.0	10.B	22828.6	10.8	62.9
2007	4549.9	9.9	1947.4	9.9	25088+6	9+9	62.9
2008	5000.3	9.9	2140.2	9.9	27572.4	9.9	62.9
2009	5495.3	9,9	2352,1	9,9	30302.0	9.9	62.9
2010	6039.4	9,9	2585.0	9.9	33301.9	9.9	62.9
2011	6638.0	9.9	2841.0	9.9	36593.6	9,9	62.9
2012	7295.2	9.9	3122.3	9.9	40216.4	9.9	62,9
2013	8017.4	9.9	3431.4	9.9	44197.8	9.9	62.9
AVRG.		12.1		12.1		12.1	•

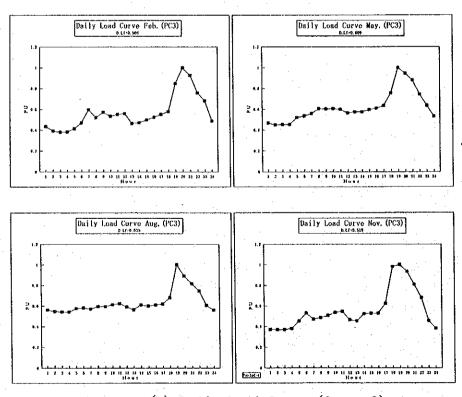


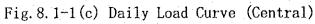


Demand at Generation end JICA (Base)

TABLE 1.2.3 ANNUAL LOAD OF CENTER

LOAI FACTO	GR.RATE	ENERGY	GR, RATE		GR.RATE	05441040	
(%	(%)	(GWH)			(%)	PEAKLOAD (MW)	YEAR
51.3				58.0			
	24.4					189.0	1993
			24.4	72.2			
						292.5	1995
			15.9			336.0	1996
51.9	14.5	1750.5	14.5	119.1	14.5	384.7	1997
51.9	14.5	2004.3	14.5	136.3	14.5	440.5	1998
51.9	14.5	2294.9	14.5	156.1	14.5	504.4	1999
51.9	14.5	2627.7	14.5	178.8	14.5	577.5	2000
53.5	10.0	2890.4	13.0	202.0	6.7	616.0	2001
53.5	10.3	3188.1	10.3	222.8	10.3	679.4	2002
53.5	10.3	3516.5	10.3	245.8	10.3	749.4	2003
53.5	10.3	3878.7	10.3	271.1	10.3	826+6	2004
53.5	10.3	4278.2	10.3	299.0	10.3	911.8	2005
53.6	12.9	4830.0	12.4	336.0	12.6		2006
53.6	9.3	5279.2	9.3	367.2		1122.5	2007
53.6	9.3	5770.2	9.3	401.4	9.3	1226.9	2008
53.6	9.3	6306.8	9.3	438.7	9.3	1341.0	2009
53.6	9.3	6893.4	9.3	479.5	9.3	1465.7	2010
53.6	9.9	7575,9		527.0	9.9	1611.0	2011
53.6	9.3	8280.5	9.3	576.0	9.3	1760.8	2012
53.6	9.3	9050.6	9.3	629.6	9.3	1924.6	2013
	12.6		12.7		12.3		AVRG.





	· ·	COAL Fired	P PLANT		Sout	£
I ten	Northern Coal (yr1995)	<u>ت</u>	Northern Coal (yr2005)	Northern Coal (yr2010)	Southern Coal (yr2005)	Southern Coal (yr2010)
P ant: size	3 0 0 MW× 2			· · · · · · · · · · · · · · · · · · ·		
Construction Cost (US\$)	T 5 0 × 1 0°		•	:		
OUnit Cost (COST/NW)	\$1,250/km(FC=\$1000/km,LC=\$250/km	\$250/su).				·
سه	25 yr (Pf=70%)					
Station Service	6.0%					
Maintenance	4 0 d a Y S					·
FOR	8,0%					
Ave. Efficency	34.0%			c u	2529Kcal/kWh	2529Kca1/kWh
SHeat Rate	2529Kcal/kWh	2529Kcai/kWh	2529Kcal/kwn	5 2 8 7	2 · ·	1 6 1
€Fuel Price BW-	\$25/ton	\$28/ton	\$32/ton	5 35/ton	\$ 4 2 / ton	
2. Brixed O&M cost	4.8%	4.8%	4.8%	% 8		
CRF <u>r(1+r) </u>	0. 11017	0. 11017	0, 11017	0. 11017		
			0 0 v v 0 0 v v	5500Kcal/kg	5500Kca1/kg	5500Kca1/kg
÷ O	5500Kca/kg					
Annual Cost						
(1) for construction cost	\$131.7/Kw(=@xCBP)	5RF)				
@ for O&M	\$ 6 0. 0 / K w(=0×®)				- - -	0 9 0 0 0
③ Fuel Cost (\$\Kwh)	0.01150	0.01287	0.01471	0.01609	0.01431	2 2 2 2
=(0.5) =(0.5) =(0.10)	4. 374¢/XWh (3. 224+1. 150)	4. 511¢/Kwh (3. 224+1. 287)	4. 695¢/Kwh (3. 224+1. 471)	4. 833¢/Kwh (3. 224+1. 609)	5. 155¢/Kwh (3. 224+1. 931)	5. 293¢/Kwh (3. 224+2. 059
= { (①+②) /7008th+③} ×100 ¢ PT=80%	3.971¢∕Kwh (2.821+1.150)	4. 108¢∕Kwh (2. 821+1. 287)	4. 292¢/Kwh (2. 821+1. 471)	4. 430¢/Kwh (2. 821+1. 609)	4. 752¢/Kwh (2. 821+1. 931)	4.890¢/Kwh -(2.821+2.06
Inp. Data to ESPRIT LFUEL (\$/10 ³ Kcal)	0.004545	0.005091	0.005818	0.006364	0.007636	0.008182

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19. A

INPUT DATA for ESPRIT VIETNAM THERMAL POWER PLANT DATA (2/2)

(A) I CA)

4. 87.6 ¢∕Kwh (=2. 222+2.654) 5. 193¢∕Kwh (=2. 539+2. 654) \$3.5 million BTU (yr2013) \$125.0×10³m³ 0.02654 013889 0 4. 8 1 4 × / Kwh (=2. 5 3 9 + 2. 2 7 5) 4. 497¢∕Kwh (=2. 222+2. 275) \$107.14/10³ a³ \$3.0 million BTU (yr2010) 0. 02275 011905 \$110. $5/Kw = 0 \times CRF / 0.85$ Output decrease 15% by temperature rise COMBINED CYCLE (South) . 0 4.435¢/Kwh (=2.539+1.896) 4. 118¢/Kwh (=2. 222+1. 896) \$2.5 million BTU (yr2005) \$83.23×10³m³ 009921 0.0189.6 . \$45.2/Kw (=@×@/0.85) GAS \$2.0 million BTU('95~2000) 0 001937 18TU=0, 252Kcal 4.056¢∕Kwh (=2.539+1.517) 3. 739¢∕Kwh (=2. 222+1. 517) \$800/Ku (PC=640, LC=160) 20 yr (Pf=70%) 1911Kcal/Kwh \$71.43/10³m³ 9000Kcal/m³ 0.01517 3 0 0 MW× 2 480×10⁵ 0.11746 35days 45.0% 4.8% 1 5% 6.0 =@x@+@ Generation Cost = {((()+@))/6132#+@) x100 ¢ Generation Cost = { ((①+②) /100811r+③) ×100 ¢ Pr=804 Fuel Cost (\$\Kwh) 1 n p. D a t a f o r E S P R I T L F U E L (\$ ∕ 1 0³ K c a 1) ■⊕+© Plant Type Station Service (1+ r (1+ r) OUnit Cost (Cost/Kw) r(1+r)®Fixed O&M cost Ave. Efficency © Caloric Unit Plant Life(n) Construction Cost (US\$) Maintenance for construction cost Annual Cost Plant size GFuel Price ©Heat Rate @ for 0&M at r = 10%tem F.0 R CRF

ATA	۰.	I CA. (EPD
C)	÷	

INPUT

Vietnam Hydro Plant Data (1/2) Average Year(P=50%)

												ľ		1		
11 13 14 162 16 162 16 162 163	Plant Name (North)	Installed Cap. ×No. Unit		Annual Sere. Energy	Seeson Quarter 1st	L Cenerati 2nd :	can (Guh) 3rd	ម្មី	Power Qierter Ist		A) Peak/ F. 3rd ::	ទ	Armual Coost Local (\$/KM) 10%	(\$/KW) Foregin (\$/KW) 60%	lot.constr. cost × 10° \$ At the level'93	
6x200x 81 87 106 657 100 750 750 100 100 750 750 100 750 <td></td> <td>3×36₩</td> <td>#2 .71</td> <td>rt39CMh</td> <td>Я</td> <td> 83</td> <td>145</td> <td>911</td> <td>108/ 0</td> <td></td> <td></td> <td>0,901</td> <td>Existing</td> <td></td> <td></td> <td></td>		3×36₩	#2 .71	rt39CMh	Я	 83	145	911	108/ 0			0,901	Existing			
8,6,07/35 1,1,3 with large Statis 1		8×24044	Ç¥ 6	8797 (8mits)	Indepent 1649	ent Operati 1650 :: 1	13300 13300 1ax:2700	5198			1250/0521	1920/563	Bristing		-	
2x3004 2011- 253 153 151 551 500/3 553 600/3 2730 (65) 2700 (65)			5,6,7 '93 18, 94	11,113 with 9,659 with	n Lange So Small So Small So		increments		s are added	tto Son Le	i after 3rd	unit .				
2×300 200 2776 641 711 826 772 600734 6507140 712 600740 712 710 712 710 711 711 711 711 712 711 712 711 712 711 712 711 712 712 711 712 711 712 712 712 712 712 712 712 712 712 712 712 712 712 712 713 713 713 713 713		HADDE X C	2007~	23 13	<i>16</i> 17	195	677	ß	• • • • • • • • •			011/009	1580 (10%)	(109) 0.122	2370 (68%)	
Z×300 Z00 Z76 64.1 711 82 772 60.733 560.740 74. (267) 27. (267)		Ute~c	~ 3 00€	2976	5	172	27 86	Я		563/122		600/1110	(%22) 71.4	237 (80%)	(m ⁻ 9) 522	Cost of transmis
2xx300 2010 275 641 711 820 720 660/130 74 7201 237 640 74 237 640 74 233 650/130 74 235 660/130 721 237 640 721 237 640 721 237 640 721 237 640 723 640 743 743 743 743 743 743 743 743 743 743 743 743 743			~ ₩	2976	5	172	 З	ß	600/134	583/122	•••••	0111/009	(%0Z) 71L	(%) (90%)	223 (6.14)	-sion
Z × 300 Z11 Zerie Hu Hu Hu Hu Hu Hu Zerie Gonrial Tra (2007) Zerie (3007) Zerie (3007) <td></td> <td>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</td> <td>~0102</td> <td>2976</td> <td>5</td> <td>LITL</td> <td> 2778</td> <td>ß</td> <td>600/134</td> <td>583/122</td> <td>•••••</td> <td>0111/009</td> <td>(%22) 71.</td> <td>297 (80%)</td> <td>223 (6.4%)</td> <td>excluded</td>		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~0102	2976	5	LITL	 2778	ß	600/134	583/122	•••••	0111/009	(%22) 71.	297 (80%)	223 (6.4%)	excluded
Zx300 Z012- Z876 Eul Tul Eu2 Ty2 E00/131 SS3/12 E00/130 Tul (205) Z37 (E03) Z23 (E04) Zx300 Zx200- Z012- Z72 L60 S201 L60 Z23 (E04) Zx200- Z012- Z72 L60 S201 L60 Z21 (E03) T1.2 (E03) Z21 (E03) Zx200- Z00- Z20 L53 T72 571 L60/53 E60/130 E61/23 E61/23 T1.2 (E03)	. `		~1102	2976	5	1712	575 675	<u>7</u> 2	600/134	28/122	600/208	600/140	- (%22) TL	297 (80%)	223 (6.4%)	
Total Troal Troal <th< td=""><td></td><td>5×300</td><td>2012~</td><td>2976</td><td>5</td><td>InL</td><td>윮</td><td><u>7</u>2</td><td>600/134</td><td>563/122</td><td>600/208</td><td>0111/009</td><td>74 (20%)</td><td>297 (80%)</td><td>223 (6-4%)</td><td></td></th<>		5×300	2012~	2976	5	InL	윮	<u>7</u> 2	600/134	563/122	600/208	0111/009	74 (20%)	297 (80%)	223 (6-4%)	
2 x 2 LOM 2007 1966 u10 151 574 560 % 380/100 1162 (405) 1712 (667) 1734 (667) 2 x 2 LOM 2003 2201 142 143 752 577 480/59 380/102 480/139 68 723 (687) 164 (67) 2 x 2 LOM 2003 2201 142 143 752 577 480/59 380/102 480/139 68 723 (687) 164 (67) 2 x 2 LOM 2003 2201 122 153 752 590/102 480/139 68 723 (687) 164 (67) 2 x 2 LOM 2011 2201 122 153 720 480/139 68 723 (681) 164 (67) 2 x 2 LOM 2011 2201 142 152 723 480/139 164 (78) 164 (78) 2 x 2 LOM 2011 223 380/12			total	17393	3702	2627	1687	4512							Tot.3485 (100%)	
Zx/200 Z00- Z201 U2 U5 T5 T7 U80/ 55 330/102 U80/130 E8 Z73 E807 T641 E807 Zx/200 Z00- Z201 U2 U53 T52 T7 U80/ 55 330/102 U80/130 E8 Z73 E807 T641 E807 Zx/200 Z00- Z201 U22 U53 T52 577 U80/ 55 330/102 U80/130 E8 Z73 E807 T641 E807 Zx/200 Z010- Z201 U22 U53 T52 5717 U80/ 55 330/102 U80/130 E8 Z73 E807 T641 E807 T641 E807 T641 E807 T641 E807 T641 E807 T641 T641 E807 T641 T641 E807 T641 E807 T641 E807 T641 E807 T641 E807 T641 T641 E807 T641 E807 T641 T641				8861	0 1	151	574	<u> </u>	1180/95	380/102	002/0631	130/130	1162 (LUCK)	1712 (60%)	(\$39) 1661	
2000- 2201 L22 L93 752 577 L80/ 55 380/102 L80/ 37 66 (237) 273 (837) 164 (67) 2010- 2201 L22 L33 752 577 L80/ 55 380/102 L80/ 73 66 (237) 273 (837) 164 (67) 2010- 2201 L22 L33 752 5710 L80/ 55 380/102 L80/ 73 66 (237) 273 (837) 164 (67) 2011- 2201 L22 L33 752 570 L80/ 55 380/102 L80/ 73 66 (237) 273 (837) 164 (67) 2011- 2203 3262 380/102 L80/ 73 L91/ 107 773 (807) 164 (67) 2005- 1000 101 161 165/ 76 320/76 320/75 739 (407) 164 (67) 164 (67) 2005- 2005 20070 20070 20070 20070 201/107 273 (407) 164 (67) 164 (67) 2005- 210 100 100/100	~	2 < 240	~	ī0 X	ğ	<u>بر</u>	<u></u> д	21	1001 1001	380/102	002/081	180/130	68 (20%)	(1108) Elz	(*8) 791	Cost of Transmis
2010- 2204 L22 L15 752 577 L60/ 55 360/102 L60/30 66 (20%) 273 (80%) 164 (6%) 2011- 2204 L22 L53 752 570 L60/50 L60/70 273 (80%) 164 (6%) 2011- 2204 L22 L53 752 570 L60/70 L60/70 273 (80%) 164 (6%) 2011- 2204 L22 L53 752 570 L60/70 L60/70 273 (80%) 164 (6%) 2011- 2004 2040 20076 350/75 L93(L0%) 773 (80%) 164 (6%) 2005- 1000 L10 167 105/28 350/76 L93(L0%) 161 (0%) 300 (10%) 2003- 201 20070 L60/100 L93(L0%) 161 (0%) 300 (10%) 2003- 110 167 105/28 350/76 105/28 739(L0%) 161 (0%) 164 (6%) 2003- 110 167 20070 100/20			~euc	10	ß	Ŗ	 βζ	21/	160/ 3 2	380/102	1180/200	0€1/081	68 (207)	573 (80%)	164 (8%)	-sion line is
2011~ ZOU UZ2 US3 TS2 T70 UB0/130 E8 (203) Z73 (80%) 161 TOTAL ICEOU ZOB ZEOB ZEO UBD/130 E8 (ZOG) ZEO		UiC ^ C	~0102	NON S	8	ន្រ្	Ŗ	211	1807 95	380/102	002/081	0€1/087	68 (20%)	ZT3 (80%)	[67] (82) [67]	excluded
total 10204 2096 Z63 352 2841 Tot.2058 2002 1177 440 413 440 453 550/76 550/75 550/75 551(60%) 350 2003 507 13 440 167 165/26 150/75 139(40%) 110 194 2003 507 13 140 167 165/26 157/14 250/75 139(40%) 1108(60%) 194 2003 13 14 167 165/26 157/14 250/167 250/65 49(40%) 194 2002 214 233/60 167/74 250/167 250/65 49(40%) 172(60%) 301 2002 2012 14402 200/100 400/100 400/100 1007(30 201/67 722(60%) 515 44 2012 1442 250 400/100 400/100 400/100 400/100 515 722(60%) 515 44 2013 1492 3		2×2m	~[[02	10 22	23	ផ្អ	ĮŽ	270		380/102	002/031	061/0811	68 (20%)	ZT3 (80%)	164 (8%)	
ZODZ~ 1777 LILD LIS TLD LIS SSO/65 SSO/65 SSO/65 SSO/65 SSO/67 <			:	10301	860X	263 263	3582	۶.							Tot.2050 (100%)	
2003~ 507 130 100 110 167 105/28 100/20 102/32 739(4007) 1108(6607) 194 2002~ 1308 246 320 463 279 233/60 167/14 250/65 463(4007) 1108(6607) 194 2002~ 1308 246 320 463 400 100/100 250/65 463(4007) 722(607) 301 2012~ 1492* 256 300 466 400 400/100 400/100 515(407) 515 2013~ 1492* 256 300 465 400 400/100 400/100 110(207) 440(807) 515		- Mular		E.	011	F 13	011	퀅	350/88	350/63	350/65	350/95	(2011)1611	(203)	380 (100%)	
2002~ 1308 246 330 463 279 233/60 187/74 250/167 291/407 720(60%) 2012~ 1492* 256 300 496 400 400/100 400/100 515(40%) 772(60%) 2013~ 1492* 256 300 496 400 400/100 400/100 515(40%) 772(60%) 2013~ 1492* 256 300 496 400 400/100 400/100 110(20%) 1440(80%)		E E	2003~	5	ጅ	8	6	167	105/28	100/20	102/21	105/32	(%017)6624	1108(60%)	(2001) 1161	
2012~ 1492 * 266 300 456 400 400/100 400/100 400/100 515(40%) 772(60%) 2013~ Trollodes discrarge to downstreem (Sonta-HoeBirnh) 400/100 400/100 110(20%) 440(80%) 2013~ 1492 * 256 300 456 400/100 400/100 110(20%) 440(80%)		8	~2002	1308 1	246	8	163 1	279	09/652	187774	250/107	2 9/02	(2011)1811	722(60%)	(2001) LOE	
2013~ [Includes discharge to domostream (source theorem) upp/100 upp/100 upp/100 upp/100 110(20%) 110(20%)		2×2004	2012~	* 26171	8		<u>ک</u>	8		001/00m	001/00m	100/100	(‰)3515	772(60%)	515 (70%)	
		2×20044	~5013~	Includes 1492 +	discharge 296	ß				001/00#	100/100	001/001	110(20%)	1110(80%)	(302) 220 (302)	

INPUT DATA for ESPRIT JICA (EPDC)

Vietnam Hydro Plant Data (2/2) Average Year(P=50%)

Tot.Corstr. Cost × 10° \$ Connent At the level'93			TR.		358	/ 187 المحتا	374* Benefit	20 Imigati	FL3	711				(%0E) 051 (%0L) 05E	R	33	110	83	514	8	221	661	115	276
(\$/KW) oregin (\$/KW) 60%	Existing	Ddisting	672(70%)		~ T16 (65%)	ر TOT (65%)	1118 (103)	(%09) 051	1478 (60%)	11/011 (60%)				600 (60%) 333 (80%)	1250 (60%)	618 (60%)	1000 (60%)	513 (60%)	842 (60%)	1000 (60%)	so (1003)	1042 (60%)	85-1 (60%)	(201) (201)
Ammel Coost Local (\$/KW) F	Existing	Evisting	268(30%)		(%52) /117	(1985) 085	(12011) 6611	200 (110%)	(1011) 586	(%) 936				(1202) (2011) (2011)	(1001) ESB	(2011) Zin	666 (110%)	(11011) 2715	262 (110%)	(MOR) 199	(1007) 265	(MOH) 569	568 (140%)	(1001) 1752 (11021)
Firm Ltth	160/ 0	Etr/0011	150/0		2002	172/0	20/02	20/02						360/ 0 360/ 0	120/ 0	66/ 0	0 /02	220/78	360/125	60/09	116/27	81/0	81/0	260/70
H) Peek/	160/ 0	365/15	0/051		300/0	172/0	800	0//81						에 시 IR	120/ 0	66/ 0	0 /0L	220/58	360/105	0, /09	116/27	80/0	81/0	260/55
Power Output (MM) Peak/ Firm Inter at : 2nd : 3nd : 41	160/ 0	370/45	150/0		0/00£	172/0	9/00	175/0						0 0 2000 2000	0 /021	66/0	0 /02	911/022	360/83	0, 09	116/27	80/0	81/0	260/20
Poter Querter 1st	160/ 0	01/001	150/0		30/0	172/0	0/00£	0/661						.0 360/ 0	0 /021	66/ 0	0 /02	511/022	69/09£	60/ 0	116/27	80/ 0	81/0	260/117
臣	8	ĝ	152.6		E2	171	99 19	99 99	88 88	<u></u> .8				262	8	60.8	<u>8</u>	312	265	6	ន្ទ	6	8	8
tion (Ghh) 3rd	88	8	678		8	8	8	Ř	Ř	3				0Un 110	8	8.6	府	516	ŝ	67	ଞ	8	<u>1</u> 2	 F
Seescral Generation (GMn) Quarter 1st : 2nd : 3nd	8	8	8		51 51	5	ស៊	ស្ន	57 25	9				88	8	8	R	218	76E	67	ଞ	6	0[191
St Orest	8	Ŕ	8		1751	16	208	ស្ន	ឆ្ន	Q:				370 370	1 6		8	213	88	67	8	<u></u>	8	775
kınual Generat. Erergy	(GM) 1159	8 <u>1</u> 883	589.5		972	3	1218	8	53	8				06/1 1/20	*98 ²	228.6	102	1079	0181	112	8	8	0,17	*92
Comissioning Yr.			1651		2002		~ 5002	× 900 300	~ 5002					2000 1999	. ~ 1002	5661	1998	~ 202	2006	<u>2005</u> ∼	~ 7007 2007	~ 5007	2002	~ 1002
Installed Cap. XNO. Unit	, 17×11044	00L×17	2 X 15		Mage ×2	~~×8644	8	8	26	ន		MAZ1	ž	2×1804 2×1804	120M	2×334	2×35%	8	99E	3	911	8	8	MUX
Plant Name (South & Cent)	Existing South Da Nhim	Tri An	Thac Mo	(Planing)	Hen Thuan	Ca M	Daí Nình	Dong Naili	Dong Nai8	Can Can Can	Existing> Central	Dray H' linh	An Diem	Plarning> Taly #1,2 #3,4	Plei Krong	Ving Sonh(Vinh Son)	Song Hun	Se San #3	Se San #u	Son Con2	An Kre	ନ୍ସିର ଭିଞ୍ଚା	Burn Outp	Three Kon The

INPUT DATA for ESPRIT JICA (EPDC)

10.230

ALC: NO

Vietnam Hydro Plant Data, Dry year (P-90%)

							(%1-1	142)	(100					(F	(%001	(%)	100%)	(%001	70%)	(102
			2370 (61	% 87	9 83	9 53 53	9 83	9) 53 9)	Tot. 3485 (1	1394 (6	161 (S	9) 751	35 161	161 (5	Tot.2050 (8	<u>ि</u> ह	.) 106	515 ((202) (202)
Evisting	Evisting		ZZ10 (60%)	297 (80%)	237 (80%)	297 (80%)	257 (80%)	297 (80%)		1742 (60%)	(108) Elz	(%) (%) (%) (%) (%) (%) (%) (%) (%) (%)	ZT3 (80%)	(%08) 512		651(60%)	1108(60%)	722(60%)	772(60%)	(208)0111
Existing	Existing		(%01) 0851	71 (ZOZ) UT	74 (20%)	74 (202)	(%CZ) 71L	74 (20%)		1162 (2011)	68 (20%)	68 (20%)	(%2) 89	68 (20%)		(2011)17671	(110m)6EL	(±011)18h	515(40%)	110(202)
108/ 0	282/0061	unit	600/120	621/009	600/120	620/120	600/120	621/20		190/ 65	180/ 65	£9 ∕03⊓	180/ 65	180/ 65		0 /050	105/ 0	0 /052	0/001	0/0011
108/ D	1100/2011	a after 3rd	600/220	600/220	600/220	00 00 00 00 00	600/220	600/220		1160/200	1180/200	002/08m	1180/200	002/0811		323/0	0/201	20/0	0/00m	1 uded
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108/0	1900/270	s are adde		573/110	573/110	573/110	573/110	573/110		180/65	160/65	59/08t	1130/65	1180/65		290/ 0	102/0		380/0	a & Hora Bùr I 280/0
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td=""><td>3.×56 81 * 70 82 * 11 20204 91 65 65 65 70 100 * 0 102 * 0 102 * 0 102 * 0 102 * 0 102 * 0 102 * 0 102 * 0 102 * 0 102 * 0 102 * 0 100 * 0 102 * 0 100 * 0 102 * 0 100 * 0 102 * 0 100 * 0 102 * 0 100 * 0 102 * 0 100 * 0 102 * 0 100 * 0 10</td><td>3.X:56 11.70 R.1.71 2000h 91 65 68 100/10 91/10 67 100/10 100/20 100/10 100/20 10</td><td>3x:56 1*170 167:11 3500 16 16 16 10 100</td><td>3/35 81 770 87/11 2000h 91 65 65 65 100 100/20</td><td>3×5 8 170 87.11 3200h 91 65 8 100 91/10 80.11 3000h 91 65 8 100 91/10 80.11</td></th<></td></t<> <td>3 x 45 81 TO 82 TO 95 TO 55 TO 95 TO <t< td=""><td>3 x 56 11 m m m m m m m m m m m m m m m m m m</td><td>3 x 45 11 m m m m m m m m m m m m m m m m m m</td></t<></td>	3×36 #1 *10 #2 *11 3200h 91 65 65 100 000 102/0 Existing Existing 8×200W #1 *10 #2 *11 3200h 91 65 70 100/0 102/0 Existing Existing 8×200W #1 *10 #2 *10 87 1500 237 1412 1900/270 100/271 1900/282 Existing Existing 8×200W #1 *2 93.4 100/271	3 × 36 81 * 70 82 * 11 333 81 * 70 82 * 11 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Appendix (Chapter-8) INPUT DATA for ESPRIT JICA (EPDC)

Vietnam Hydro Plant Data, wet year (P=10%)

comment						Cost of Cost	transmis sion	line is excluded				~			هرسندتو بای ا			******		7		
Tot.Constr. Cost ×10°\$ At the level'93					2370 (68%)	223 (6-4%)	223 (6.4%)	223 (6.4%)	(223 (6.147)	223 (6.1%)	Tot. 3485 (100%)	(1239) 176EL	164 (8%)	164 (8%)	(268) 1791	164 (8%)	Tot.2050 (100%)	330 (100%)	(2001) 1/61	301 (100%)	515 (70%)	(1002) 022
t (\$/KW) Foregin (\$/KW) 60%					2370 (60%)	257 (80%)	297 (80%)	297 (80%)	297 (80%)	297 (80%)		1742 (60%)	573 (20%)	(1008) 5.1.2	(1908) Eliz	273 (30%)		(%09)159	1108(60%)	722(60%)	776(60%)	(1008)01111
Annual. Coost Local (\$/KW) 10%			'		(2017) 0851	17F (50%)	171 (ZOZ)	(%CZ) 71.L	177 (SOX)	74 (20%)		1162 (40%)	68 (20%)	(%) (%)	66 (20%)	68 (20%)		(%)11011	(10m)6EL	(1011)1811	515(MOK)	110(20%)
Firm Ltth		108./0	005/0261	. unit	600/200	600/200	600/200	600/200	600/200	600/200		021/081	061/087	0€1/087	0£1/081	061/0811		350/ 0	105/32	250/65	100/0	100/0
Power Output (Mi) Peak/ Firm urter tt : 2rd 3rd : U		0,801	1920/300 1317/300 1383/300	after 3rd	600/200	600/200	600/200	600/200	600/200	600/200		1150/200	1160/200	100Z/081	002/0811	190/200		317/ 0	105/21	101/052	0/0011	0/001
r Output (0/06	1317/300	energys are added to Son La	600/200	600/200	600/200	600/200	600/200	600/200		380/102	300/102	380/102	380/102	380/102		330/ 0	100/20	18174	100/0	0/001
Poue Otarter Ist		0 0 0	00£/0261	are added	600/2009	600/200	600/200	600/200	600/200	600/200		180/95	180/ 95	183/ 93	180/95	56./081		350/ 0	105/28	233/60	100/0	
uth		116	2370		8 <u>9</u>	817	817	817	817	817	1/2/1	274	83	89	ŝ	ŝ	2398	267	0,11	83	8	
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Annal Sere. Prerey	2	U-DÓST	%19 (Bunits)	J 12,401 with Son La 1 10,547 with Son La S	3010	89 85	3568	3568	3568	3269	20850	2134	368	98 22	9 82	38 N	11598	202	22	2011	1630	1630
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Installed Cap.	×10. 014	3×3644	8×240%		2×300%	5×30	5×300	5×300	2×30	2×300		2×24044	2×240	2×2110	2×240	2×240		BOOK .	, B	× N	2×20044	2×200%
Plant Name (North)					(Iarge)				·	د		(Lianz)					- <u>-</u>	•			41,2	#3°n
Plant Name ((Existing) That Ba	Hca Binh		Planning> Son La 1,2 (Large)	3,4	ς, δ,	7,8	9,10	11,12		Son La 1,2	3, и	5,6	7,8	9,10	•	Ban Mai	Ota Dat	Cai Thi	Huoi Quang	· · · ·

List of Study Cases

(1) Basic Case, Demand: JICA Base

1) With Son La

Case① : SL/GL (Son La Large+Gas Large) Case② : SL/GS (Son La Large+Gas Small) Case③ : SS/GL (Son La Small+Gas Large) Case④ : SS/GS (Son La Small+Gas Small)

2) Without Son La

Case01 : NS/GL (No-Son La+Gas Large)

Case02 : NS/GS (No-Son La+Gas Small)

(2) Optional Case

1) Demand JICA High Case

Case⑤ : SL/GL (Son La Large+Gas Large) Case⑥ : SL/GS (Son La Large+Gas Small) Case⑦ : SS/GL (Son La Small+Gas Large) Case⑧ : SS/GS (Son La Small+Gas Small)

2) Delayed Son La (2 years), Demand: JICA Base Case() : SL/GS Case() : SS/GS

3) Riliability (LOLP=3.0%)

Case(1): SS/GS , Demand: JICA Base

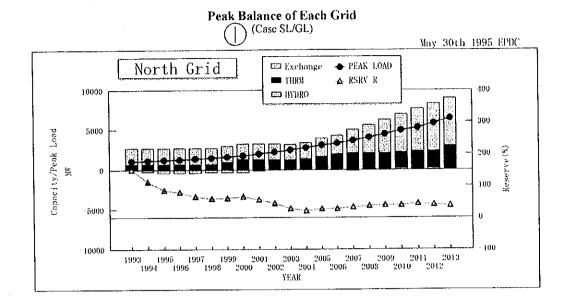
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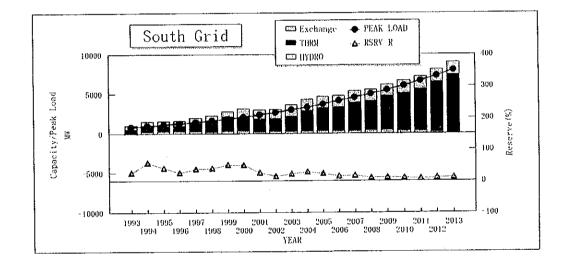
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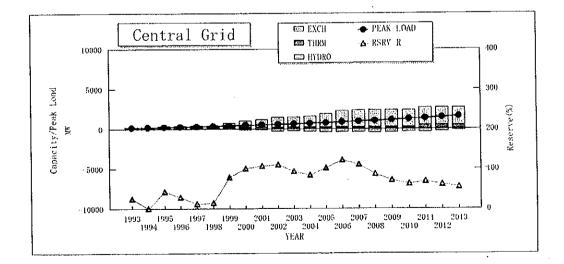
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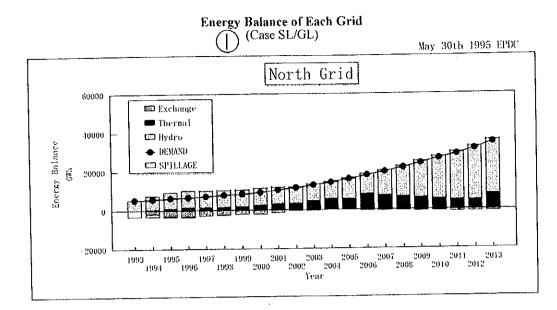


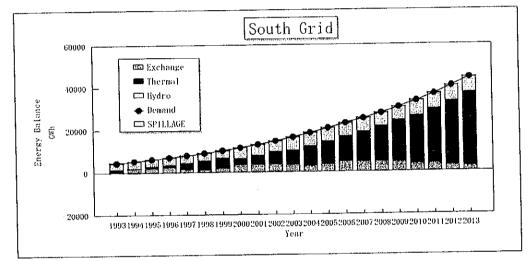


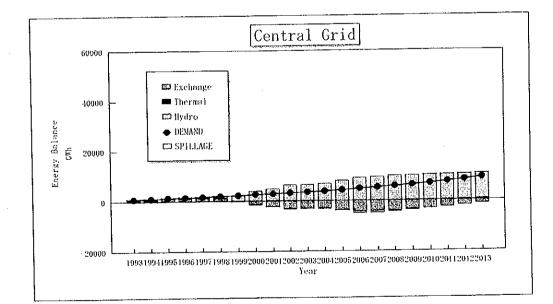
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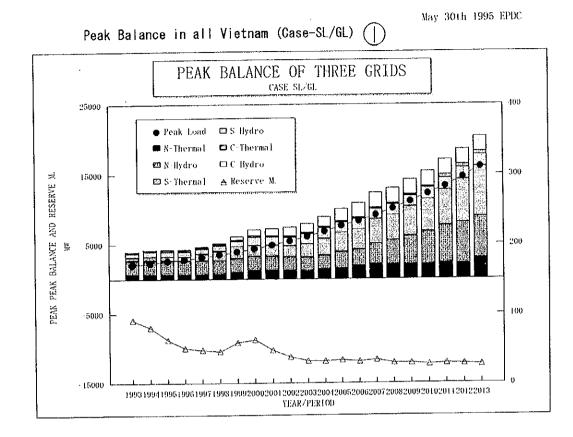
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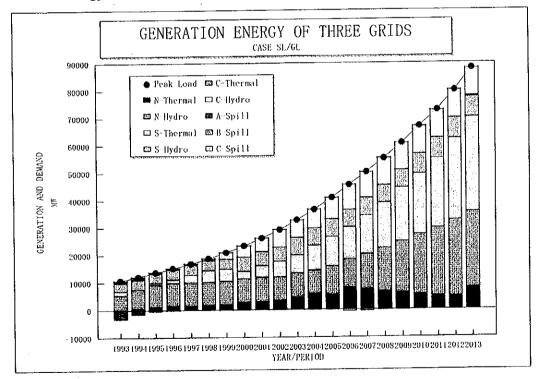
Energy Balance in all Vietnam

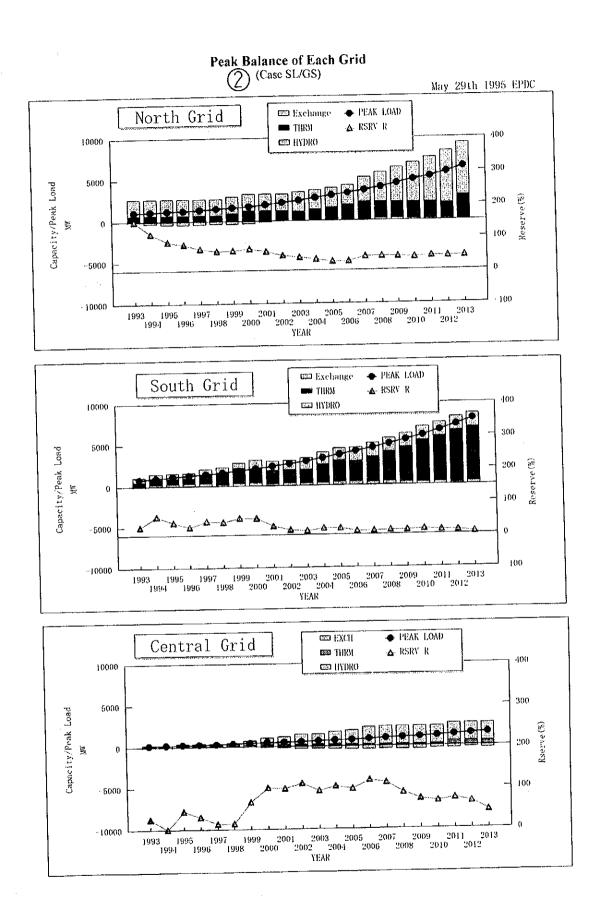
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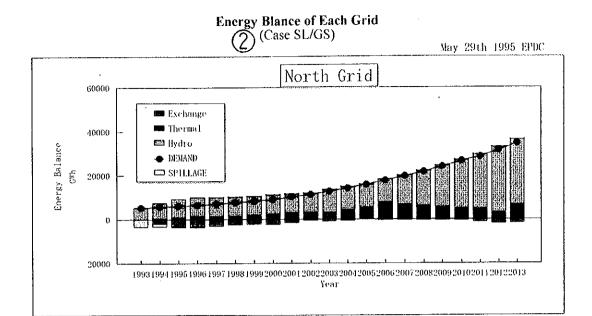
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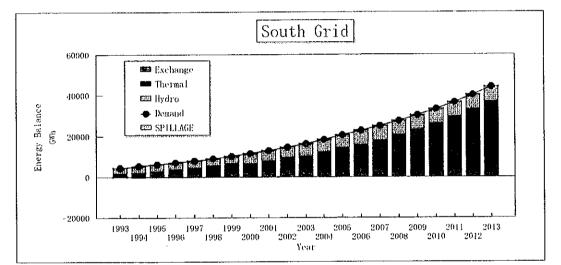
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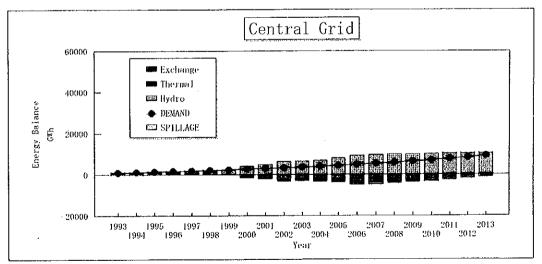
May 30th 1995 EPDC







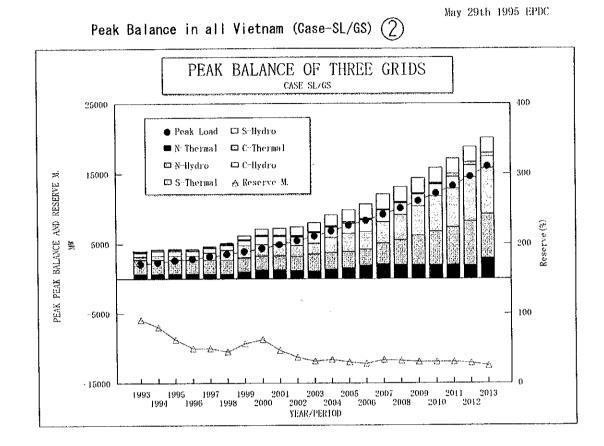




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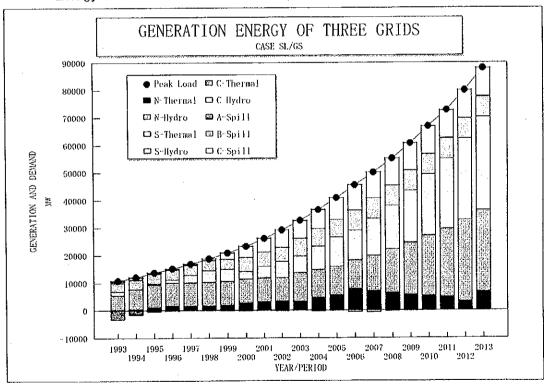
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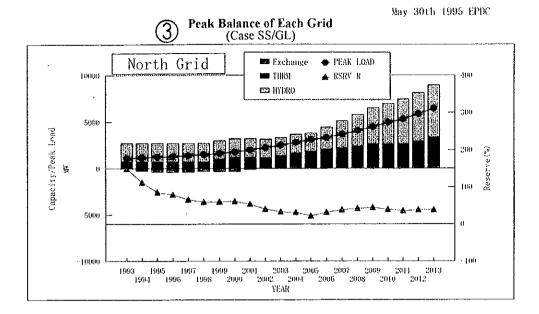
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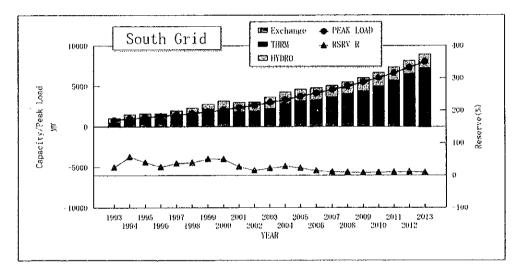


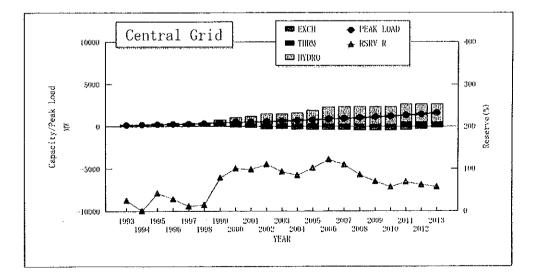
Energy Balance in all Vietnam (SL/GS)

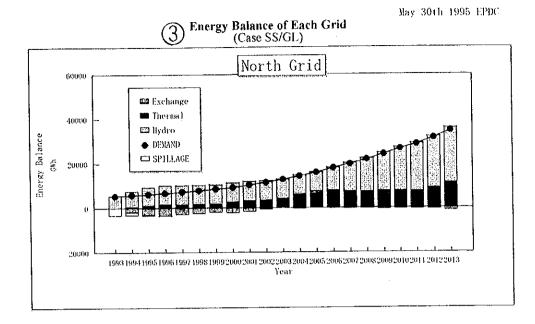
May 29th 1995 EPDC

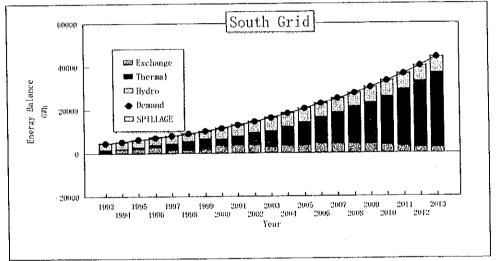


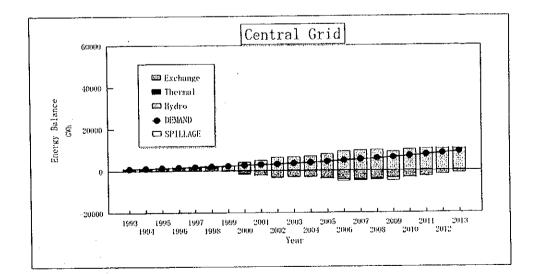










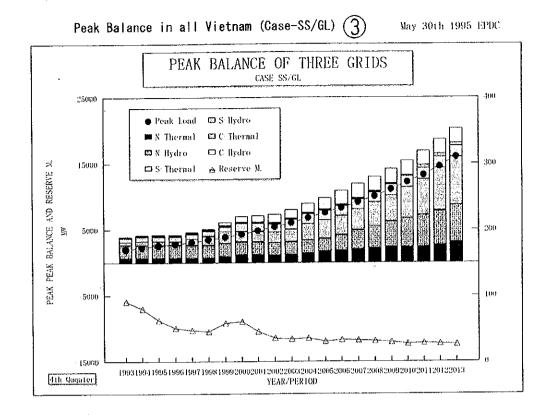


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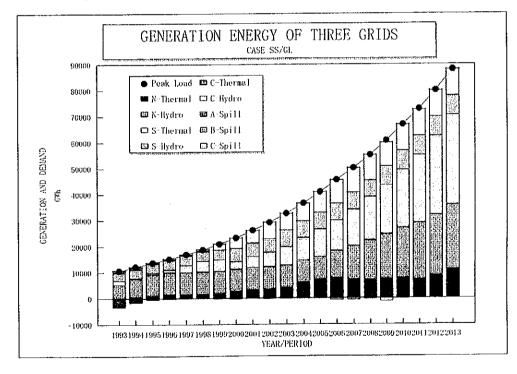
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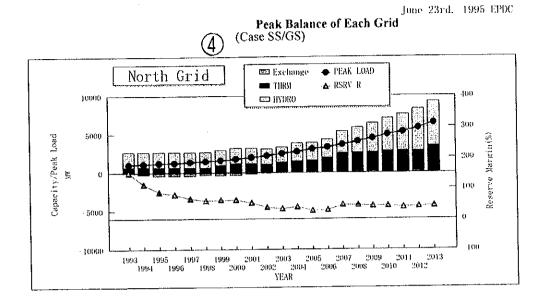
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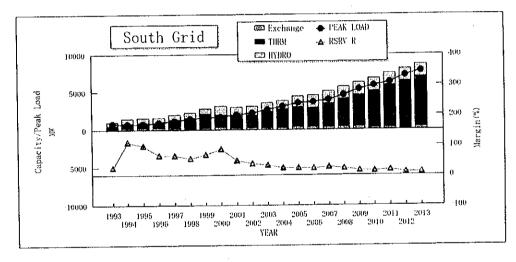


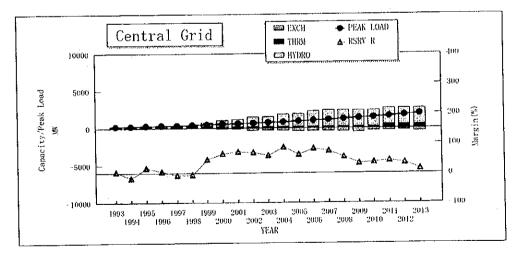
Energy Balance in all Vietnam

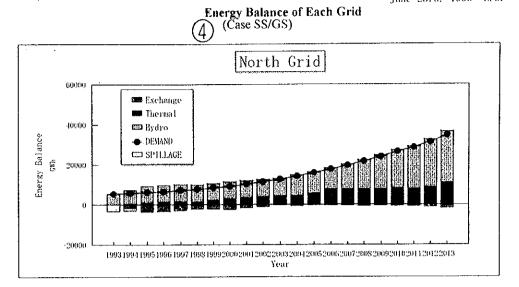
May 30th 1995 EPDC

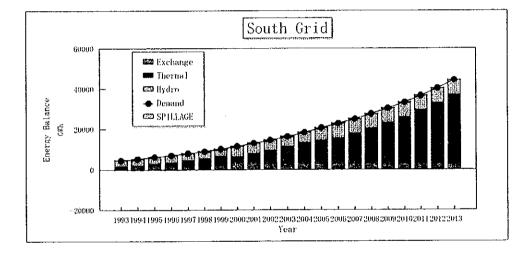


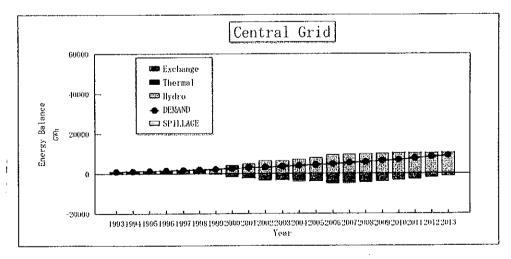




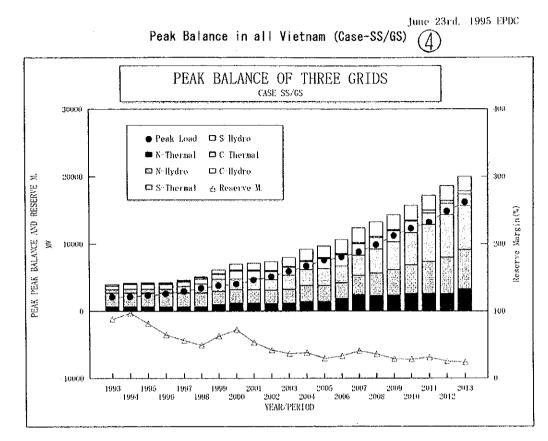








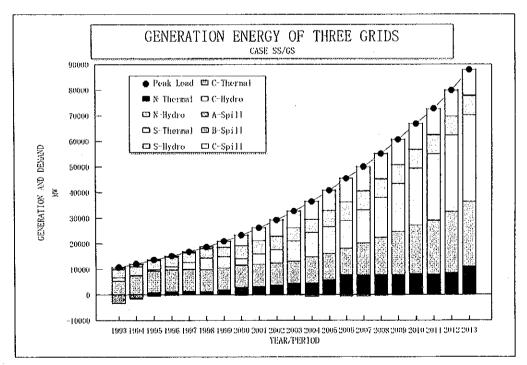
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June 23rd. 1995 EPDC

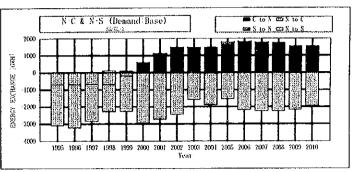
Energy Balance in all Vietnam (Case-SS/GS)

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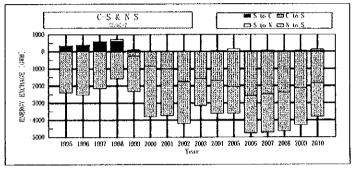
Case:SS/6L-2 June 23 (1/2) SonLa(2007yr) Energy flow on inter line N-C & N-S

	enersy tra	nsfer (Gih	energy tra	nsfer (6)h
eur.	15 to C	8 10 5	C to N	S tu N
199	684.0	2405.0	<u>(), ()</u>	0,0
199	685.0	2533.0	0,0	0.0
199	631.0	2150.0	0.0	0.0
199	695.0	1581.0	0.0	121.0
199	199.0	2062. 0	85, 0	18, 0
200) 5.0	2947.0	587,0	0,0
200	0.0	2730.0	1102.0	0.0
200	2 0.0	2436.0	1472.0	0.0
200	3. 0.0	1571.0	1433.0	22.0
200	1 8.0	1886, 0	1451.0	20.0
200.	5 0.0	1551.0	1605, 0	166.0
200	3 0.0	2179.0	1753, 0	43. 0
200	0.0	2242.0	1688.0	69.0
200	2.0	2252.0	1718.0	25.0
200	12.0	2159.0	1507.0	41.0
201	2 1.0	1954.0	1470.0	82.0
otal	2972	34638	15871	610



Energy flow on inter line C-S & N-S SS/CL(2/2

	energy-tra	nsfer (GMa	energy tra	nsfer (6%h
iear	C to S	R to S	S to C	S to N
1995	0.0	2405.0	<u>31</u> 7.0	0.0
1996	0.0	2533.0	369, 0	0.0
1997	0,0	2150.0	574.0	0,0
1998	1, 0	1581.0	595. Q	134.0
1999	258.0	2062.0	90, 0	18.0
2000	847.0	2947.0	24.0	0.0
2001	1004, 0	2730.0	1.0	Ð. O
2002	1769, 0	2436.0	0.0	0.0
2003	1585.0	1571.0	0.0	22, 0
2004	1713.0	1386.0	37.0	20.0
2005	2054.0	1551.0	0.0	166, 0
2006	2588.0	2179.0	0,0	13.0
2007	2496.0	2242.0	4.0	69, 0
2008	2398.0	2252.0	3.0	25, 0
2009	2137.0	2159.0	18.0	41.0
2010	1814.0	1954, 0	45.0	\$2.0
Jotal	20694	34638	2080	610



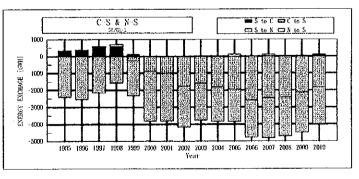
Energy Exchange Case-(3) SS/GL (Base Case)

Case:SL/GL-2 June 23 (1/2) Sonta(2007yr) Energy flow on inter line N-C & N-S

	energy-tra	nsfer(GTh	energy-transfer(GW	
icar	S to C	N 10 S	C LO N	S to 8
1995	684.0	2405.0	0.0	0.0
1996	685.0	2533.0	0.0	0.0
1997	681.0	2150.0	0,0	0.0
1998	695.0	1581.0	0.0	126.0
1999	199.0	2062.0	S5.0	18.0
2000	1.0	2959.0	554.0	0.0
2001	4.0	2898.0	1081.0	0.0
2002	Q, Û	2393, 0	1472.0	0.0
2003	1.0	2182.0	1379.0	0.0
2004	9,0	2007.0	1448.0	3.0
2005	0.0	1880.0	1639.0	107.0
2006	0.0	2167.0	1721.0	9,0
2007	0.0	2336.0	695.0	95.0
2608	0.0	2297.0	1725.0	10.0
2009	12.0	2348.0	1628.0	22.0
2010	0.0	2186.0	1463.0	67.0
otal	2974	36294	15820	457

SL/GL02/2 Energy flow on inter line C-S & N-S

	energy tra	psfer(6%h	chergy: tra	nsfer(tifa
icar	C to S	N to S	S to C	S 10 N
1995	0.0	2405, 9	317.0	0.0
1996	0.0	2533.0	369.0	0.0
1997	0. G	2150.0	571.0	0.0
1998	1.0	1581.0	595.0	126. 0
1999	25\$, 0	2062.0	90.0	18.0
2000	851.0	2959.0	21.0	U. 0
2001	1000.0	2808.0	0.0	0. 0
2002	1774.0	2393.0	0.0	0. 0
2003	1585.0	2182.0	0,0	0.0
2004	1818.0	2007.0	28.0	3, 6
2005	1957.0	1880.0	1.0	107. 0
2006	2606.0	2167.0	0.0	9, 0
2007	2475.0	2336.0	3, 0	95, (
2008	2419.0	2297.0	5.0	10, 0
2009	2137.0	2348.0	13.0	22.0
2010	1818.0	2186.0	36.0	67.0
Iotal	20785	36294	2052	457

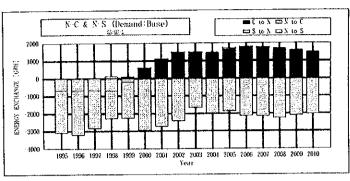


Energy Exchange Case-(1) SL/GL (Base Case)

EPDC

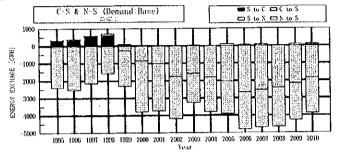
EPDC

	energy-tra	nster (6Th	energy: tra	nsfer(Gh
icar	N to C	N 10 S	C to N	S to N
1995	i <u>6</u> 84.0	2405.0	0.0	0.0
1996	685.0	2533.0	0.0	0.0
1997	681.0	2150.0	0.0	0,0
1998	695.0	1581.0	0,0	126.0
1999	199.0	2062.0	85.0	15.0
2000	5.0	2947.0	587.0	0,0
200	1 <u> </u>	2730, 0	1102.0	0,0
2003	0.0	2428.0	1477.0	0.0
200	3 <u>0.0</u>	1667.0	1414.0	42.0
200	4 3.0	1979, 0	1446.0	13.0
200	5 0.0	1872.0	1616.0	96.0
200	6 0,0	2133.0	1732.0	<u>51.0</u>
200	7 0.0	2149.0	1687.0	74.0
	8 6.0	2257.0	1685.0	13.0
200	9 11.0	2104.0	1524.0	77.0
201	0 2.0	2034.0	1424.0	74.0
lota	2971	35031	15809	584



SS/6S (2+2)

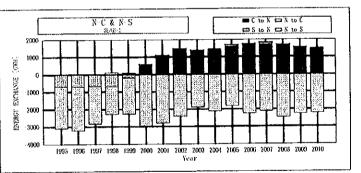
	enerevetra	nster (Gih	energy-tra	nsfer (Gili
Year	C to S	X to S	S to C	S to N
1995	0.0	2405.0	317.0	0.0
1996	0.0	2533.0	369,0	0.0
1997	0.0	2150.0	574,0	0.0
1995	1.0	1581, 0	595.0	126.0
1999	258.0	2062.0	90.0	18.0
2000	\$17.0	2947.0	24.0	0.0
.2001	1001.0	2730.0	4.0	0.0
2002	1769.0	2428.0	0.0	0.0
2003	1577.0	1667.0	0.0	42.0
2004	1507.0	1979.0	14.0	13.0
2005	2035.0	1872, 0	0.0	95.0
2006	2668.0	2133.0	0.0	51.0
2007	2555.0	2149.0	11.0	74.0
2008	2414.0	2267.0	5.0	13.0
2009	2167.0	2101.0	5.0	11,0
2010	1840.0	2034.0	38.0	74.0
lotal	20933	35031	2046	584

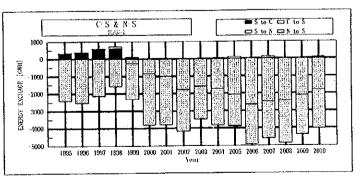


Energy Exchange Case-(4) SS/GS (Base Case)

Case (SL/6S-2) (fune (23) (1/2)) = SunLa (2007yr)

	energy: tra	isfer(Gib	enervy-tra	energy: transfer(GWh energy-transfer(GWh	
Year	N. 10 C.	N 10 S	Cto N	Ston	
1995_	684.0	2405.0	0.0	0.0	
1980	685.0	2533.0	0.0	0.0	
1997	681.0	2150.0	0.0	0.0	
1998	695.0	1581.0	0.0	126.0	
1999	199.0	2062.0	<u>85.</u> 0	15,0	
2000	5.0	2962.0	584.0	0.0	
2003	2.0	2785.0	1088.0	0, 0	
2002	0.0	2393.0	1472.0	0.0	
2003	0.0	1888.0	1387.0	0.0	
2004	12.0	2103. 0	1443.0	12.0	
2005	0.0	1814.0	1583.0	106.0	
2006	U. 0	2257.0	1739.0	0.0	
2007	0.0	2118.0	1701.0	123.0	
2008	1.0	2147.0	1700.0	0.0	
2009	12.0	2259.0	1634.0	12.0	
2010	2.0	2225.0	1447.0	49, 0	
lotal	2978	35982	15763	-116	





Energy Exchange Case-(2) SL/GS (Base Case)

Tear	C to S	N 10 5	Stol	5 10 0
1995	0.0	2405.0	317.0	0.0
1996	0.0	2533.0	369.0	0.0
1997	0.0	2150.0	574.0	0.0
1998	1.0	1581.0	<u>595. 0</u>	126.0
1999	258.0	2062.0	90.0	18.0
3000	846.0	2962.0	24.0	0.0
2001	1,006, 0	2785.0	3.0	0.0
2002	1774.0	2393.0	0.0	0.0
2003	1592.0	1858.0	0.0	0.0
2004	1726.0	2103.0	.27. 0	12.0
2005	2086.0	1814.0	0.0	106.0
2006	2654.0	2257.0	0.0	0.0
2007	2476.0	2118.0	12.0	123.0
2008	2417.0	2447.0	2.0	0.0
2009	2115.0	2259.0	19.0	12.0
2010	1805.0	2225.0	35.0	49.0
letal	20756	35982	2070	446

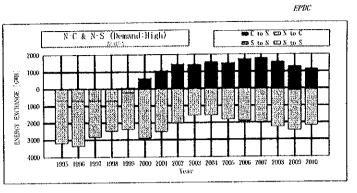
energy-transfer(Gib energy-transfer(Gib

\$L/\$\$ (2/2

T.

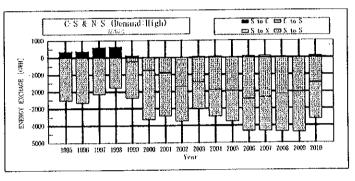
Case(SS/GS 2 June 24th (1/2) Sonta(2007yr) Decond(Bigh Energy flow on inter line N-C & N-S

	lenergy tra	nsfer (68h	energy tra	usfer (69th
Yeau	S 10 C	N 10 S	C. 12. N	5 to N
1995	664.0	2513.0	0.0	0.0
1996	698.0	2655, 0	0.0	0.0
1997	693.0	2136.0	0.0	0.0
1998	705.0	1772.0	0.0	5.0
1999	225.0	2145.0	53.0	0,0
3000	15.0	2881.0	608.0	0.0
2001	0.0	2524.0	1034.0	0.0
2002	0,0	2039.0	1421.0	12, 0
2003	6, 0	1557.0	1362.0	55,0
2004	2.0	1569, 0	1484.0	60.0
2005	0.0	1802.0	1457,0	15.0
2006	0.0	1896. 0	1637.0	67.0
2007	13.0	1977.0	1693.0	88.0
2008	37.0	2215.0	15 <u>24.</u> 0	41.0
2009	\$4.0	2366.0	1268.0	15.0
2010	53, 0	2126.0	1126.0	27.0
Jotal	3195	34179	14667	385



ss/6812/2 Energy flow on inter line C-S & N-SDemand High

	energy (13)	nsfer(Gib	energy tra	nsfer (G%h
lear	C 10 S	N to S	S to C	S to 8
1995	0.0	2513.0	<u>342.</u> 0	0.0
1996	0.0	2655.0	370.0	0.0
1997	0.0	2136.0	588.0	0.0
1998	0.0	1772.0	616.0	5.0
1999	232.0	2348.0	106.0	0.0
2000	751.0	2884.0	24.0	0.0
2001	906, 0	2524.0	0.0	0.0
2002	1700.0	2039.0	U.Q	12.0
2003	1440.0	1557.0	0.0	55.0
2004	1894.0	1569, 0	0,0	60.0
2005	1963.0	1802.0	5.0	15.0
2006	2435.0	1896.0	S. 0	67,0
2007	2352.0	1977.0	<u>0.</u> 0	88.0
2008	2149.0	2215.0	6.0	41.0
2009	2039.0	2366.0	18.0	15.0
2010	1481.0	2126.0	67.0	27.0
Total	19332	34179	2150	386



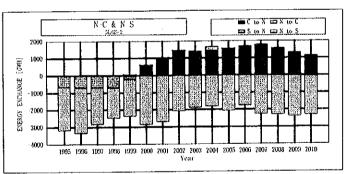
Energy Exchange Case-(8) SS/GS (High Case)

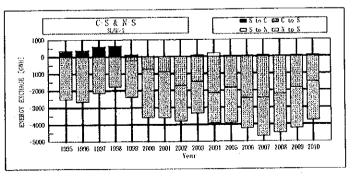
Case:SL/6S-2 June 23rd. (1/2) SunLa(2007yr) Energy flow on inter line N-C & N-SDM:High

	energy-tra	nsfertG≣h	energy tra	nsfer (GTh
ieur.	S to C	N Lo_S	C to N	S 10 N
1995	664.0	2513.0	0,0	0,0
1996	693. 0	2655.0	0.0	0.0
1997	693.0	2136.0	0.0	0.0
1998	705.0	1772.0	0.0	5.0
1999	225.0	2148.0	53.0	0.0
2000	15.0	2834.0	6(6), ()	0,0
2001	U. 0	2682.0	1024.0	0,0
2002	0.0	2068. 0	1423.0	21.0
2003	9.0	1854.0	1351.0	52, 0
2004	9.0	1802.0	1453.0	210.0
2005	0.0	2054.0	1530.0	27.0
2006	1.0	1760.0	1690.0	13.0
2007	1.0	2269.0	1700.0	74.0
2003	28, 0	2261.0	1552.0	11.0
2009	30.0	2360.0	1303.0	21.0
2010	63.0	2251.0	1132.0	15.0
Total	3131	35419	1451)	452

SL/6S(2/2 Energy flow on inter line C-S & N-S

	energy-tra	nsfer (G¥h	ener <u>gy-tra</u>	usfer (Gili
Year	C to S	N to S	S to C	l S to N
1995	0.0	2513.0	342.0	0.0
1996	0.0	2655.0	376.0	0.0
1997	0.0	2136.0	588.0	0.0
1998	0.0	1772.0	616.0	5.0
1999	232.0	2148.0	106.0	0.0
2000	741.0	2834.0	21,0	0.0
2001	901.0	2682.0	1,0	0.0
2002	1725, 0	2065.0	0.0	21.0
2003	1487.0	1854. 0	41.0	52, 0
2004	2132.0	1802.0	0.0	210.0
2005	1850.0	2054.0	9.0	27.0
2006	2467.0	1760.0	22.0	13.0
2007	2428.0	2269.0	0.0	74.0
2003	2221.0	2261.0	5.0	14.0
2009	1863.0	2360.0	22.0	21,0
2010	1508.0	2251.0	76.0	<u>] 15. (</u>
lotal	19556	35419	2222	452





Energy Exchange Case-(6) SL/GS (High Case)

(yr. 1993 ~ 2013)

Case① : SL/GL (Son La Large+Gas Large)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

	·	NORTH	SOUTH	CENTER	TOTAL
COST(K\$):	TOTAL	4069885	4845632	795679	9711197
	i	3894414	4054034	1143233	9091683
	CAPITAL	3503631	2454219	553393	6511244
		3299818	2287133	1040583	6627534
-	OPERATION	566254	2391411	242286	3199951
		594596	1766900	102651	2464147
	FVEL	324932	1798585	215195	2338712
		371622	1313731	86301	1771654
	0 & M	241321	592826	27091	861239
		222974	453169	16350	69249
LOLP		1.34	3,98	28.24	11.18
(DAYS)	YEAR)	1.84	1.54	6.91	3.43
UNSERVED	ENERGY	111.6	226.4	918.0	1256.0
	WH)	168.4	105.0	253.3	526.

Case② : SL/GS (Son La Large+Gas Small)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

			(ISOLATED/CO	NNECTED >
		NORTH	SOUTH	CENTER	TOTAL
COST(K\$): TOTAL	4069885	5112549	795679	9978114
		3988360	4281106	1128291	9397757
	CAPITAL	3503631	2763343	553393	6820368
		3423821	2536520	1025805	6986147
	OPERATION	566254	2349204	242286	3157744
		564538	1744584	102486	2411608
	FUEL	324932	1755249	215195	2295376
		349226	1285385	86149	1720759
-	0 & M	241321	593956	27091	862368
[.]		215312	459200	16337	690849
LOLP		1.34	5.10	28.24	11.56
(DA)	S/YEAR)	1.95	1,49	6.37	3.27
UNSERVE	D ENERGY	111.6	383.5	918.0	1413.1
	GWH)	179.9	100.1	220.1	500.0

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(1993 ~ 2013) Case③ : SS/GL (Son La Small+Gas Large)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

	NORTH	SOUTH	CENTER	TOTAL
 cost(k\$):total	3554801	4843855	795679	9194335
	3256874	4088302	1142668	8487845
CAPITAL	3037778	2454219	553393	6045391
	2585601	2316502	1040583	5942687
OPERATION	517023	2389634	242286	3148943
OFERATION	671273	1771798	102085	2545157
FUEL	287004	1796808	215195	2299007
	422362	1316212	85779	1824352
. 0 & M	230019	592826	27091	849936
	248911	455587	16306	720804
LOLP	1.08	3,98	28.24	11,10
(DAYS/YEAR)	1.85	1.53	5.97	3,12
UNSERVED ENERGY	79.0	226.4	91Å.O	1223.4
(GWH)	167.7	104.4	220.3	492.5

Case④ : SS/GS (Son La Small+Gas Small)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

		C	ISOLATED/CO	NNECTED)
	NORTH	SOUTH	CENTER	TOTAL
COST(K\$):TOTAL	3554801	5122197	795679	9472678
	3455978	4285729	1142472	8884181
CAPITAL	3037778	2738965	553393	6330137
	2760986	2553406	1040583	6354976
OPERATION	517023	2383231	242286	3142539
UPERAT200	694992	1732322	101890	2529204
FUEL	287004	1780202	215195	2282401
, occ	435505	1275970	85599	1797074
0 & M	230019	603029	27091	860138
• • • •	259487	456351	16291	732130
LOLP	1,08	5.30	28.24	11.54
(DAYS/YEAR)	1.82	1.38	6.04	3.08
UNSERVED ENERGY	79.0	409.9	918.0	1406.9
(GWH)	165.5	93.8	208.1	467.4

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

				ISOLATED/CO	ONNECTED)
		NORTH	SOUTH	CENTER	TOTAL
COST(K\$)	TOTAL	3319079	4851308	795679	8966066
		3178788	4095565	1124003	8398357
	CAPITAL	2521062	2509620	553393	5584076
		2315917	2376238	1020709	5712865
	OPERATION	798016	2341686	242286	3381989
	÷· -····	862871	1719325	103295	2685491
	FUEL	484758	1759175	215195	2459128
		553331	1275793	86895	1916020
	0 & M	313258	582512	27091	922861
		309540	443532	16399	769471
LOLP		1.26	4.17	28.24	11.22
	YEAR)	1.83	1,26	5,86	2.99
UNSERVES	ENERGY	105.6	238.1	918.0	1261.7
	WH)	177.4		201.5	461.4

Case02 : NS/GS (No-Son La+Gas Small)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

	NORTH	SOUTH	CENTER	τοται
COST(K\$):TOTAL	3319079	5338685	795679	9453444
	3211242	4517570	1135754	886456
CAPITAL	2521062	3007765	553393	608222
· · ·	2314102	2799735	1031376	614521
OPERATION	798016	2330919	242286	337122
	897140	1717834	104378	271935
FVEL	484758	1738345	215195	243829
	575138	1264717	87895	192775
0 & M	313258	592574	27091	93292
	322002	453117	16483	79160
LOLP	1.26	4.23	28.24	11.2
(DAYS/YEAR)	1.72	1.45	6.22	3.1
UNSERVED ENERGY	105.6	241.9	918.0	1265.
(GWH)	174.4	92.3	211.5	478.

(1993 ~ 2013)

Case⑤ : SL/GL (Son La Large+Gas Large)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

ONNECTED)	ISOLATED/C	(
TOTAL	CENTER	SOUTH	NORTH	
10989265	940214	5658274	4390776	COST(K\$):TOTAL
10580882	1147250	4952842	4480790	
7522938	685204	3013502	3824231	CAPITAL
7719286	1040583	2854074	3824628	
3466325	255010	2644770	566546	OPERATION
2861599	106667	2098766	656161	
2540003	226940	1986405	326659	FUEL
2060626	90008	1559869	410749	
926322	28070	658365	239887	0 & M
800968	16659	538898	245412	
12.18	30,04	4.99	1.52	LOLP
3.28	6,56	1.35	1.93	(DAYS/YEAR)
1466.4	1017.3	327.9	121,1	UNSERVED ENERGY
517.1	233.5	108.4	175.2	(GWH)

Case⑥ : SL/GS (Son La Large+Gas Small)

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TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

	÷ .	NORTH	SOUTH	CENTER	TOTAL
COST(K\$):TOTAL		4390776	5913206	940214	11244197
		4565726	5164095	1151743	10881565
	CAPITAL	3824231	3313866	685204	7823301
		3823976	3139568	1040583	8004128
	OPERATION	566546	2599338	255010	3420894
		741750	2024526	111161	2877436
	FUEL	326659	1946821	226940	2500419
		467994	1495363	94156	2057513
	0 & M	239887	652518	28070	920474
		273755	529163	17005	819923
LOLP	•	1,52	9.50	30.04	13.69
	/YEAR)	2.09	1.67	8.81	4.19
UNSERVED	ENERGY	121.1	932.2	1017.3	2070.7
	WH)	197.6	132,8	399.4	729.8

(1993 ~ 2013) Case⑦ : SS/GL (Son La Small+Gas Large)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

			ISOLATED/C	
	NORTH	SOUTH	CENTER	TOTAL
COST(K\$): TOTAL	3843159	5660656	940214	10444029
	3772669	4935944	1148098	9856712
CAPITAL	3251097	2997339	685204	6933641
	3027696	2850631	1040583	6918911
OPERATION	592062	2663315	255010	3510386
	744973	2085311	107515	2937799
FUEL	338555	1999595	226940	2565090
	469188	1550569	90791	2110548
0 & M	253507	663720	28070	945297
	275785	534742	16724	827251
LOLP	1.62	4.94	30.04	12.20
(DAYS/YEAR)	1.95	1.47	6.68	3,37
UNSERVED ENERGY	120.3	323,3	1017.3	1460.9
(GWH)	174.3	105.7	244.5	524.6

Case® : SS/GS (Son La Small+Gas Small)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

		NORTH	SOUTH	CENTER	TOTAL
COST(K\$):	TOTAL	3843159	5915824	940214	10699197
		3899635	5157939	1148277	10205852
	CAPITAL	3251097	3284710	685204	7221012
		3108572	3133989	1034995	7277557
	OPERATION	592062	2631112	255010	3478184
		791063	2023949	113282	2928294
	FUEL	338555	1969917	226940	2535412
		498844	1497041	96114	2091999
	0 & M	253507	661196	28070	942772
	• • • •	292220	526908	17168	836295
LOLP	1	1.62	10.36	30.04	14.01
	YEAR)	2.08	1.82	8.50	4.13
UNSERVED	ENERGY	120.3	1209.7	1017.3	2347.3
	WH)	191.7	138.8	395.2	725.8

(1993 ~ 2013)

Case(9) : Delayed SonLa(L)(2yr.)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

		(ISOLATED/C	NNECTED)
	NORTH	SOUTH	CENTER	TOTAL
COST(K\$): TOTAL	4011789	5112549	795679	9920018
	4052274	4276658.	1133894	9462827
CAPITAL	3355393	2763343	553393	6672130
		2553087		6841298
OPERATION	656396	2349204	242286	3247887
	795440	1723570	102518	2621528
FUEL	389589	1755249	215195	2360032
	507682	1269252	86179	1863113
0 & M	266807	593956	27091	887854
	287758	454317	16340	758415
LOLP	1.41	5.10	28.24	11.58
(DAYS/YEAR)	1.87			3.37
UNSERVED ENERGY	113.7	383.5	918.0	1415.3
(GWH)	188.1	92.7		524.7

Case(1): Delayed SonLa(S)(2yr.)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

		NORTH	SOUTH	CENTER	TOTAL
COST(KS	S): TOTAL	3659080	5122197	795679	9576957
		3578191	4284687.	1142740	9005618
	CAPITAL	3019377	2738965	553393	6311736
		2742727	2553406	1040583	6336716
	OPERATION	639703	2383231	242286	3265220
		835464	1731280	102157	2668901
	FUEL	374010	1780202	215195	2369407
		532212	1275160	85845	1893218
	0 & M	265694	603029	27091	895813
		303251	456120	16312	775683
LOLP		1.30	5,30	28.24	11.61
(DA	YS/YEAR)	1,86	1.41	5.98	3.08
UNSERV	ED ENERGY	98.4	409.9	918.0	1426.4
	(GWH)	182.4	92.0	204.2	478.

(yr. 1993 ~ 2013)

TABLE 4.1 COST AND RELIABILITY COMPARISON BEFORE AND AFTER INTERCONNECTION

		(ISOLATED/CO	ONNECTED)
	NORTH	SOUTH	CENTER	TOTAL
COST(K\$):TOTAL	3309948	4964148	764350	9038445
	3175979	4073034	1110465	8359479
CAPITAL	2831278	2617353	493790	5942421
	2436307	2303924	998488	5738719 158-3
OPERATION	478670	2346793	270559	3096023
	739672	1769109	111978	2620759
FUEL	268319	1765675	241293	2275287
	477537	1315803	94910	1888251
0 & M	210351	581119	29266	820736
	262135	453306	17067	732508
LOLP	3.89	7.92	30.03	13.95
(DAYS/YEAR)	4.72	3.70	8,48	5.63
UNSERVED ENERGY	321.0	646.4	987.6	1954.9
(GWH)	409.0	287.0	337.0	1033.0

Riliability (LOLP=3.0%)

Case1 : <code>SS/GS</code> , <code>Demand: JICA</code> Base

DM: Base Case

Central Region

Southern Region

Appendix Commissioning Year of Each Power Plant (Case-SL/GL)

TABLE 5.1.2 ADDITION UNITS AFTER INTERCONNE TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER

TABLE 5.1.1 ADDITION UNITS AFTER INTERCONNECTION OF NORTH

Northern Region

NAME :	HBAN	to A I	HCUA HSON	NOSH NO	120	15 ON	NOSH	HSON	COUA	LOLP		NAME :		t v d H	ě	3	+ 3 3 2	LOLP		NAME		HSE .	HBUO	HSE HP	HPLI HPLI	HSON		RAO HTHU		LOLP
CAP : CAP.	350	250	105 6(600 600	009	1009	\$00	009		MAINT NOMNT (Days/Year)	NOMNT YEAR)	CAP.1 YEAR	CAP.	300	800	- 00F		MAINT NOMNT (DAYS/YEAR)	NOMNT YEAR)	CAP .:	CAP.	320	81	1995 1995 1995	116		00 00 00	260		1 1
1993	0	0	0	0	0	0	0	0	0	. 0.0	0.23	1993	•	0	0	0	•	0.17	0.39	2661	0	0	٥	0	0	0	0	0	ł	1
7661	0	0	0	0	0	0	0	0	0	0.45	64.0	1994	0	•	٥	0	0	0.00	0.00	7661	0	•	٥	¢	•	0	õ			16 47.15
1995	0	0	0	0	•	o	0	٥		0.76	1.70	1995	0	•	۰.	0	0	0.01	20.02	1995	o	0	٥	٥	0	0	í o			
1996	0	0	0	Ö	0	0	0	0		1.06	1.89	1996	Ŷ		0	o	0	3.01	0.12	1996	0	0	0	o	0	¢	۔ ہ		0.0	0.0
1997	0 0	•	o	•	0 0	0	0	ø	•	1.62	1.95	1997	0	°	0	0	0	0.31	0.07	1997	0	•	0	0	o	Ŷ	¢	° 0		
8001	0	0	0	, ř	0	0	0	0	0	1.60	1.95	1998	•	ø	¢	0	٥	1.12	0.10	1998	0	•	0	0	0	.0	0	•	2	12 2.33
000	> c			, a	0	0	0	0	0	0.96	1.25	1999	°	0	¢	•	0	0.20	0.09	1999	0	0	0	¢	¢	•	6	0 0	1.45	
2000	, o	0		. 0	0	0	0	0	0	0.90	1.09	2000	0	0	Ö	٥	0	0.06	0.0	2000	0		0	0	0	。 0	0	° 0		
2001	÷	• •	0	. 0	0	0	0	0	0	1.22	1.46	2001	Ŷ	0	•	0	0	0.05	E0.0	2001	120	¢	0	0	ы	。 。	0	ہ ہ	2.06	06 0.16
2002	0 0	0		. 0	0	0	•	0	o	1.36	1.95	2002	0	•	•	0	°	1.21	0.13	2002			-	o	٥	0	o	。 。		
	<	. •	c	c	c c	ç	¢	¢	c	5 C C	1.27	2003	300	0	¢	1	¢	1.48	0.30	2002		0	¢	0	. 0	0	0	° 0	r)	
		- ·	> <	, . , .	> <	> <	, ,	, c	, ,			2006	C C H	0	•	٦	¢	2.65	0.52				• •		. c		c	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	4.23	23 0.00
	300	0 0	0 0			,	. .	b 6	- 0	0 / F	1.48	2005	000	• •	• •	ы	¢	2.38	0.23	4006	0.0		0 0	> 0) a	• 0	,	• •		
5005 5005	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	,	e e	, c	> c	• o		0	• N	2.57	1.05	2006	200		4	٥	0	2.20	0.23	2006			0	-	0	0	•			
	0 005	0	0		0	0	0	0	÷	2.82	0.24	2007	600	•	¢	~	0	2.20	0.10	2007			•	0	0	0	0	ہ ۲	4	
		d		·	· •	c	¢	c	c	1.44	0.15	2008	008	0	٥	۲	0	2.64	0.17	8000		¢	c	¢	¢	•	0	ہ د	5	33 0.01
		- <) c		• •	, c	• c	• c	, c	2.54	60,0	2009	600	0	٥	ы	o	2.85	0.20	0000			• •	0	0	0	0	0	11.89	
		• c	, c		• •	• -	. 0	0		3.11	0.04	2010	906	*	0	٥	N	2.74	0.10	2010	. 0	• •	0	ò	•	0	0	0 0		
	000	0	• •	. 0	0	0	. ••	0	0	2.69	0.01	2011	906		•	•	m	2.49	0.05	2011	Ŷ		٥	٥	٥	0	•	° 0		
	705 0	0	-	0	0	0	0	н	0	2.94	0.02	2012	1200	0	•	٥	4	2.06	0.03	2012		¢	o	0	0	0	•	0 0	0	58 0.01
2013 11	1150 0	r4	a	0	° 0	•	0	۰,	M .	3.15	0.00	2013	006	•	•	0	m	2.61	0.04	2013		•	o	o	•	0	¢	Ф 0	1.64	54 0.01
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HBAN: Ban Mai	in Mai	: MUH	HDAL: URI INI		HUUN: Wa Val	213			5			ģ	10 June 6 C/C	500		Part New Cont	1.5	•		Ž	5								1	
																								•					f	

Commissioning Year of Each Power Plant (Case-SL/GS)

Northern Region

Southern Region

TABUE 5.1.2 ADDITION UNITS AFTER INTERCONNE

1	HBAN	ĬĬ	HCUA	5 1 1	NOSH	SH SH	HSON	NOSH	Z				NAME		HDAI UDON	NEW	+ 34 4 2		LOLP		NAME:	SH
	Ĩ	HDAI	÷	HSON	л	HSON	HSON	ž	COUA	¥	LOLP	۲. م			Ě			1			 	
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-	0	0	٥	0	•	0	0	٥.	0		0.76	1.70	1995	0	5		, c	Ч		0.12	1996	ه
	ò	•	0	0	0	•	0	Ģ	•	0	1.06	1.89	1996	0	0				, r	0.07	1997	•
	0	0	0	0	0	0	0	0	0	•	1.62	1.95	1997	•	0	D	>		1			
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	0	0	0	0	0	0	0	0	\$	0		0.4	1976		,	, c	ç	0.0	20	0.09	1999	¢
	0	0	0	0	•	•	ò	0	0	0	0.96	52.1	666T	> <	,	, c	, c		MO	0.01	2000	¢
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	¢	0	0	0	0	0	•	0	0	0	1.21	1.45	2001	¢	5	5 4		 		5.12	2002	301
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											1	•			¢	c	÷	0	86	0.49	2003	•
250	0	e 1	0	0 .	0	0	0	0	0	0	55.1	707	C002		, c			0	44	0.17	2004	116
300	¢	0	٥	0	o	ò	0	0	0	-1	1.91		2004		•	• •	10	1	1.88	0.17	2005	320
	ĉ	0	•	0	0	0	ò	0	0	0	3.25	1./4	5002		1 (> c	• c	• ¢	44	0.27	2006	366
956	•	0	0	0	0	0	•	0	•	10	2.38	0.54	2006	5	P (2 0	> 4			0.02	2007	80
200	• 0	. 0	0	H	o	0	• •	0	ο.	0	2.47	0.17	2007	1200	0	0	o	4	2			
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600	0	о	0	0	¢	-1	0	0	o		2.16	0.03	2002		,	• •	• c		2.39	0.04	2010	•
600	o	ò	¢	0	0	0	-1	0	0		2 55	20.02	20102	0.00	,	• •		о н	86.	0.01	2011	•
009	о	0	¢	0	0	¢	¢	1	o	0	2 33	10.0	2011	006	Þ,		•) e 1 e	20.0	0.01	2012	0
705		0	•1	ò	•	0	0	•	•1	0	3.22	0.00	2012	006	0	Þ	>	2 1)	!			
		c	Ċ	c	¢	o	0	٥	0	4	6.73	0.01	2013	300	•	¢	0	1 5	5.28	40.0	2013	0
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Central Region

TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER

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MAINT NOMNT (DAYS/YEAR)

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SE: Se San#3 HBU0: Buon Quop HSE: SeSan#4 HPL1: Plei Krung

HSON: Son Con2 HRAD: Rao Quan HTHU: Thuong Kon Tum IAN: An Khe

NEW: New G.C/C NEW+: New Coal -

HSON: Son La COUA: Quan Ninh

8A-53

Appendix Commissioning Year of Each Power Plant (Case-SS/GL)

Southern Region

Central Region

Northern Region

	HBAN	N HDAT	13	NOS	105	HSON	NOSH	HSON	COUA HHOU	H S	ннос	LOLP	гь	NAMES		HDAT	Ô	3	+ M W N	۲٥	LOLP	NAME:	-	H USH	нвио	ş	ньгт н	HAN HS	HE NOSH	HRAO	нтни	Ľ	LOLP
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5441	- ·		• •	> <	.	o c	- -	5 c	> <			2 V 2 V 2 V	02.0	4941	. 0) 0) 0	0	• •	• •	0.00	0.00	1994	٥	0	•	٥	0	٥	•	٥	0	57.06	47.15
1005		- c > c	• •	> c	> c	e e	, 0		0	0	> 0	0.74	1.70	1995	.0		0	0	٥	0.01	0.02	1995	¢	°.	¢	0	¢	0	0	•	•	0.0	0.0
1996	, u	, 0 , 0		0	0	0	0	• •	• •	• •	0	1.06	1.89	1996	0	° 0	0	¢	•	3.01	0.12	1996	•		¢ ·	0	0	Ö	0	¢ ·	0	0.0	0
1997	• •	0	•	0	¢	•	0	¢	٥	۰	٥	1.62	1.95	1997		°.	•	•	•	16.0.	0.07	1997	0	¢	•	ò	0	0	0	o	0	1.56	1.57
			•	4	<	<	¢	<	<	4	¢		20 -	1005	c	0	0	0	o	1.12	0.10	1998	0	o	0	¢	¢	0	۰	0	o	2.72	2.33
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2008	480	0	•	¢	.н	0	¢	0	¢	0	0	2.17	0.06	2008	500	•	-1 - -	61	0	3.44	0.32	2008	•	0	¢	0	•	0	0	¢	•	1.57	00.00
	780 0		•	0	¢	Ţ	¢	0	· न	0	0	2.14	0.04	2009	600	°	•	N	0	3.17	0.29	2009	•	•	•	•	•	0	0	0	0	1.63	0.00
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	480	0	0	0	0	¢	•	-	¢	•	0	3.28	0.01	2011	006	0	•	0	ņ	2.69	0.06	2011	¢	•	0	0	0	0	φ	¢	0	0.98	10.0
- ' -	200	0	° . •	0	Ŷ	ò	٥	Ó	٦	۲	٥	2.41	0.01	2012	1200		0	ð	4	1.99	0.03	2012	¢		•	•	ò	•	0	¢	•	0.51	0.00
2013	700		•	•	0	¢	•	۰		•	-1	2,75	0.00	5013	006	°	•	٥	'n	5.64	£0.03	2013	¢	Ö	•	•	o	o	¢	۰	•	1.07	00
TOTAL 6	6200 1	1	0	1	-		-	-	8		-		5 C 1 5 3 3	TOTAL	7100		1	10	12			TOTAL	1303	-		٦	-	ч		~	-	i i i .	
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	1014- D Mai	ŝ	unus Dei Thi	ų.		HCIA- Cua Dat	Dat	· <u>9</u>	HSON: Son La	. ໆ ຮ				HDA	HDA1: Dai Ninh		NOOH	HDON: Dong Na)4	Nai4			HSE: Se	Se Santi3		0: Bu	З 8	뜻 8	ŝ	eSant	9±	L: P	HBUD: Buon Cuop HSE: SeSan#4 HPL1: Plei Krung	0u
3 5		5	3	-		:																											

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Appendix Commissioning Year of Each Power Plant (Case-SS/GS)

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Northern Region

TABLE 5.1.1 ADDITION UNITS AFTER INTERCONNECTION OF NORTH

Southern Region

TABLE 5.1.2 ADDITION UNITS AFTER INTERCONNE TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER

Central Region

	ж	HBAN H	HDAT	HCUA	HSON	HSON HS	HSON HSON	NOSH	COUA DN	а. Инои	и нно	⊃	FOL	۰a	NAME :		HDAI F	6 g	2 3 3 2 2	NEW+		LOLP	NAME		HSE HSE	HBU0	12E	H 1 1 4 H	HAN H	HR HR	нкао и нтни	DH	LOLP	Δ.
CAP.	CAP.	350	250	105	1 4 0 F	480	480	400	480	400	004	1 2	MAINT 1 CDAYS/	NOMNT YEAR)	CAP.: YEAR	CAP.	000	200	300	0 O M	MAINT (DAYS	AINT NOMNT (DAYS/YEAR)	T CAP.	c A P	220 P.	61 61	366	120	116	09	e B B	260	MAINT NOMNT (Days/Year)	YEAR)
Ĺ		1		-		-	-	-					į.		100				6	c			E001	N 1	0	0	0	Ŷ	0	٥	0	м о		36.51
£661	0	¢	0	0	0	0	0	0	ç,	ò,	•	9 ·	0.0	0.23	2001	> <	,	¢	• c	• <	00.00			ب د	. 0		•	0	0	0	٥		57.06	47.15
1994	• :	•	•	•	0	0	•	0	0	0	•	0 0	0.45	0 79	1000	> <) (> c	• •) c	0.0	20.0				 . ~	• •	0	0	0	0	¢		0.0
1995	io (• •	0	•	0 0	• •	• •	• •	• •	¢ (• •		0.76	1.70	9001		> c	> c	• •	• c	0	0.12					•	•	0	٥	0	0	0.0	0.0
1997	00	0 0		ò	• •	- • •			, ,		~ > 0	 - 0	1.62	1.95	1997		0	0	0	0	0.31	0.07			•	0	0	0	•	٥	•	0	1.56	1.57
				•	· ,							1	ļ	1	1008	Ċ	c	c	c	c	1.12		1998	đ	c	· 0	0 .0	0	0	¢	ø	¢	2.72	2 33
1998	•	0 0	• •	ç (, ,	•		0	\$ (- •	1.60		1999		• •	• •	0	0.0	0.20	0.07					0	0	0	٥	۰	0	1.45	0.35
1990		0 0	0 0	• <	0	ə <	o q	o <	•				0 40	22.1	2000	0	0	• •	0	0	0.0			. 0	• •		0	0	0	•	0	•	20.02	0.11
0002		,	,			> <		.	5 c	> <					2001	0	0	¢	0	0	0,05				120	ې د	°	ы	0	•	0	¢	2.07	0.18
2002	0	00	• •	• •	0	> o	o o	0	> o	> 0	50	- - > 0	. 59	1.99	2002	°.	0	0	0	۰	0.84				301		0 1	0	0	0	o	0	0.67	0 0
	¢	. <	¢	. <	<	• •	4	¢	¢			•			2003	600	0	٥	~	0	0.36		2003	ħ	Ŷ	~	°	٥	•	0	0	0	2.35	0.10
2002	450	•	,	> c	,	è c	, c	, ,	> c	, ,		•••	Y0.1	6 6	2004	300	0	¢	-1	0	0.34	0.16			376	5	0	۰	4	۰	0	ы	0.44	10-0
		• •	• c	• <	• •	×	> c	• •	• c	• •		• •			2005	609	-	0	0	н	1.55				60		0	•	0	4 1	0	0	1.40	0.02
2006	, vo	¢	> ¢	ċ	, ç	• c	, c	• •	• c		~ • •			10.0	2006	200	0	~	0	٥	2.37				366	~ o		۰	0	¢	۰	0	1.89	0.0
2002	1380	• •	• •	. 0		¢	• •	0	00	i m	, o		2.34	0.11	2007	009	٥	°.	0	~	1.66	0.05			ŝ	0	0	•	•	¢	ы	0	1.82	0.0
	197	Ċ	¢	ç	¢	•	¢	<	¢		č	•	0		2008	009	0	0	¢	N	1.41	50.0	5 2008	Ð	0	~	۰ د	0	٥	¢	٥	o	1.96	0.0
0 9).	<u>،</u> د	•	~	• •	> •		> •			••		2	0000	600	¢	0	0	~	2.32			0	0	c c	0	0	¢	0	٥	0	4.45	0.01
40.02		,	.	, c	,		+ <	> •	> <	, .		, , ,		60. V	2010	004	0	0	0	1 M	2.54			•	0	0	о 0	0	0	•	•	0	5.77	10.0
2102		2	ې د	,	- c	> <	, s	• <					2.70		2015	006	0	• •	0	м	2.52			- 14	0	。 。	0	0	0	۰	¢	0	1.08	0.00
2012	650	• •) ==	» o	> 0 (00	, o	» o	< o				3.47	0.01	2012	006	0	0	D	т	2.86	£0°0		N	0	0	v 0	•	•	0	0	0	1.02	0.0
2013	1300	0	¢	۰	0	0	٩	0	o	m.	0	m 	3.12	00.00	2013	300	. 0	۰	٥	ы	4.35	0.04		r 1	o		0	•	0	0	0	0	2.63	0.02
TOTAL	6800	1	-	•	-	.		1	1 1	101					TOTAL	6500		न 	m	1			TOTAL		1303	-		**	-	-		- 1		
÷ ×	HBAN: Ban Mai		HDA1: Dai Thi	Da:	Ξ	Ę	HCUA: Qua Dat	La Da		HSON:	HSON: Son La	2			HDAL	HDAI: Dai Ninh HDON: Dong Nai4	Ę.	NO4	Dong.	Naid			¥	HSE: Se San#3		HBUO	Buo	HBUD: Buon Cuop		HSE: SeSan#4	San#4	₩.	APLI: Plei Krung	i Krung
1		•																						1				•			•			

Appendix Commissioning Year of Power Plant(Case-NS/GL)

 $\begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$

Southern Region

Northern Region

TABLE 5.1.1 ADDITION UNITS AFTER INTERCONNECTION OF NORTH

HDAI NEW	: 300 300 CAP. 200 300	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0000	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0 0	0 0 0 0	600 1 0 1 0	300 0 0 1 0	600 0 0 2 0	300 0 0 1 0	500 0 1 1 0	600 0. 0 2 0					500 0 006	
. LOLP	MAINT NOMNT CAP.: Adive Stear) YEar	0.23	0.79	1.70	1.07 1.90 1996	1.94	1.93	0.94 1.23 1999	1.08	1.50	1.90	2.02	0.99	3.01 1.37 2005	0.86	25.0	0.19	2.39 0.12 2009	0.05	0.10	01.0	3.34 0.05 2013	
ON CQUA HHOU HSON HHOU	480 300 400 480 400	0 0 0 0	0 0 0 0	0 0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0	0 0 0 0	0 0 1 0 0	0 0 0 0	0 0 2 0	0 0 1 1 0	• • • •	0	0 0 m 0	0 0 0 0 0 0	0 2 0	0 0 8 0 0	
HBAN HCUA HSON HSON HDAT HSON HSON	350 105 480 480 250 480 480	0 0 0 0 0 0 0			0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0	000000	0 0 0 0 0	0 0 0 0	0 0 0 0 0 0		×50 1 0 0 0 0 0		0 0 0 0 0 009	700 0 0 0 0 0			0 0 0 0 0 0		600 0 0 0 0 0 0	35 0 0 1 0 0 0	
	CAP.										2002			÷	÷	2007 74				i.	2012 6	2013 1005	

0.39 0.11 0.03 0.03

.01

2.01

5.69 1.05

1.57 2.33

1.56

2.72

MAINT NOMNT (DAYS/YEAR)

260 0

ŝ 116

120 366

80

LOLP

интн

HSON

HPLI

HRAO

HAN

36.51 47.15 0.0 0.0

36.52

7.06

°. 0.0 0.08 0.02 0.01 0.01

\$.07

1.25 0.69

0.01 0.01 0.01 0.00

44-1 0.82 0.00

1.33

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0

0.60

TABLE 5.1.2 ADDITION UNITS AFTER INTERCONNE TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER Central Region

Appendix Commissioning Year of Power Plant(Case-NS/GS)

62)

Northern Region

TABLE 5.1.1 ADDITION UNITS AFTER INTERCONNECTION OF NORTH

CAP. 350 105 480 <th>NAME :</th> <th>Ŧ</th> <th>HBAN H</th> <th>HDAI</th> <th>нсид</th> <th>HSON</th> <th>HSON</th> <th>HSON</th> <th>HSON \$</th> <th>NOSH</th> <th>AU00</th> <th>нол</th> <th>ЛОНН</th> <th>. 7</th> <th>, TOLP</th>	NAME :	Ŧ	HBAN H	HDAI	нсид	HSON	HSON	HSON	HSON \$	NOSH	AU00	нол	ЛОНН	. 7	, TOLP
CAP. 250 480 </th <th></th> <th></th> <th>120</th> <th>i</th> <th>105</th> <th></th> <th>480</th> <th></th> <th>19</th> <th></th> <th>005</th> <th></th> <th>1 0</th> <th>MAINT</th> <th>TUMON</th>			120	i	105		480		19		005		1 0	MAINT	TUMON
0 0	EAR			250		480		480		480		400	.	(DAYS	S/YEAR)
0 0	595	0	ò	0	•	0	¢	0	0	0	•	0	0	0.0	0.23
0 0	766	0	0	0	°.	0	¢	0	0	ò	0	0	ò	0.45	
0 0 0 0 0 0 0 0 0 1 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 1 0	566	•	ò	ŝ	°	0	•	0	0	٥	٥	0	0	0.76	
0 0 0 0 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0	966	•	0	0	•	0	0	0	0	0	•	0	0	1.07	1.90
1 1	. 266	•	۰	•	•	•	•	•	0	0	•	٥	0	1.74	1.94
0 0	998.	0	ం	0	0	0	ं०	•	်ဝ	0	0	٥	¢	1.60	2611
0 0	- 664	0	¢	0	ĉ	0	Ċ	0	0	0	0	0	¢	96-0	1.23
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	000	0	0	•	0	0	0	0	٥	ø	0	0	٥.	0.74	1.08
0 0 0 0 0 1.36 0 0 0 0 0 0 0 1.46 0 0 0 0 0 0 0 0 1.46 0 0 0 0 0 0 0 1.46 1.46 0 0 0 0 0 0 0 0 1.46 0 0 0 0 0 0 0 0 1.46 0 0 0 0 0 0 0 0 1.46 0 0 0 0 0 0 0 1.46 1.46 0 0 0 0 0 0 0 1.46 1.46 0 0 0 0 0 0 0 1.46 1.46 0 0 0 0 0 0 0 0 1.46 0 0 0 0 0 0 0 0 0	100	0	0	0	•	0	0	•	0	0	0	0	0	1.16	1.50
0 0	005	•	•	0	0	•	•	ہٰ	٥	0	o ·	0	0	1.36	1.90
300 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0	. 500	0	•	0	. •	0	٥	0	٥	0	o	٥	٥	1.85	2.01
600 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0	400	300	٥	٥	۰	0	٥	0	٥	0	-	٥	٥	1.90	1.74
300 0 0 0 0 1 0 0 2.48 750 1 0 0 0 0 0 1 0 2.58 700 0 0 0 0 0 1 0 1 2.58 700 0 0 0 0 0 0 1 2.58 900 0 0 0 0 0 0 1 2.58 300 0 0 0 0 0 0 1 0 2.48 400 0 0 0 0 0 0 2.48 300 0 0 0 0 0 2.48 400 0 0 0 0 3.36 300 0 0 0 0 0 3.36 400 0 0 0 0 0 0 3.36 400 0 1 0 0 0 0 3.36 400	200	009	ę	•	٥	°	٥	0	0	0	N	0	0	1.56	۲
750 1 0 0 0 0 0 2.58 700 0 0 0 0 0 1 0 1 2.58 700 0 0 0 0 0 1 0 1 2.58 700 0 0 0 0 0 0 1 0 2.53 900 0 0 0 0 0 0 2.64 2.64 300 0 0 0 0 0 0 2.64 2.64 300 0 0 0 0 0 0 2.64 2.64 300 0 0 0 0 0 2.43 2.64 400 0 0 0 0 0 3.36 3.36 1005 0 1 0 0 0 0 2.45	906	300	0	0	¢	0	°	0	0	0		0	0	2.48	~
700 0 0 0 1 0 1 2,53 900 0 0 0 1 0 1 2,54 900 0 0 0 0 1 0 2,54 900 0 0 0 0 0 2 2,07 900 0 0 0 0 0 1 0 2,184 800 0 0 0 0 0 2 2,07 900 0 0 0 0 0 2 3,06 1005 0 0 1 0 0 3 3,06 10055 0 0 1 0 0 2 1,06	-200	750	÷!	•	•	0	۰	0	•	o	Q.	-	•	2.58	0.37
900 0 0 0 0 0 2 0 800 0 0 0 0 0 0 0 2 0 800 0 0 0 0 0 0 0 0 1 0 800 0 0 0 0 0 0 0 0 1 800 0 0 0 0 0 0 0 0 3 900 0 0 0 0 0 0 0 0 3 1005 0 1 0 0 0 0 0 0 2	800	200	•	0	¢	, °	•	. 0	¢	0	ч	•	**	2.53	0.18
300 0 0 0 0 0 0 2.81 600 0 0 0 0 0 0 2.81 300 0 0 0 0 0 0 3.36 300 0 0 0 0 0 3.36 1005 0 1 0 0 3.36	600	006	۰	•	¢	0	۰	0	o	0	ю	0	¢	2.07	
600 0 0 0 0 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 3 3 6 1 1 0 0 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 6 1 3 1 <th1< th=""> 1 <th1< th=""> <th1< th=""></th1<></th1<></th1<>	010	300	•	°	0	ò	0	0	٥	0	-1	0	¢	2.81	0.09
300 0 0 0 0 0 0 0 0 1 0 0 3.36 1005 0 0 1 0 0 0 0 0 3 0 0 2.96	110	909	¢	ò	•	•	0	0	۰	¢	N	•	•	1.80	0.05
1005 0 0 1 0 0 0 0 0 3 0 0 2.96	012	300	۰	•	•	•	o	0	0	0	،	0	o	95.5	0.09
111111111111111111111111111111111111111	013	1005	Ŷ	o	-	0	0	0	¢	0	ĸ	٥	Q	2.96	40.0
				1	•							-			

Southern Region

TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER

Central Region

HOU NEW LOLP HEU LOLP HEU HEU HEU LOLP 7.00 300 MAINT NUMHT VEAR 220 346 116 60 260 MAINT HOU LOLP 7.01 200 300 (DAYS/YEAR) YEAR 220 346 116 60 240 MAINT HO LOLP 0 0 0 0 0 0 0 0 0 36.52 36 LOAS MAINT HO LOAS 0	NAME:	-	HDAT	~	NFW	•			NAME:	ř	HSE	HSΠ	μ	HAN		HRAD			
300 300 MAINT NONNT CAP.: 220 366 116 90 MAINT MAINT		-		1DON		1EW+	L0	۲Þ			_	00		н	NOSH		ULL	רי	4
CAP: 200 300 (DAYS/YEAR) YEAR CAP. B1 120 260 260 (DAYS/Y 0			007		002		MATNT.	LUMON	C.A.P. :		20		66	11		8		MAINT	
0 0	YEAR	CAP.	, ,	200		300	(DAYS	/YEAR)	YEAR								260	(DAYS	/YEAR)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			0	10	0	0	0.17	65.0	1993	0	0	0	•	0	0	0	•	36.52	36.51
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	100	00		. 0	• •	• •	0.0	00.0	1994	0	0	0	0	•	。 。	¢	0	57.06	47.15
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	566	0		0	0	¢	0.00	0.02	1995	•	Ŷ	0	0	\$	。 。	0	۰	0.0	0.0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 1.56 0 <td>100</td> <td>0</td> <td></td> <td>0</td> <td>Q</td> <td>0</td> <td>.2.96</td> <td>0.11</td> <td>1996</td> <td>•</td> <td>0</td> <td>•</td> <td>•</td> <td>0</td> <td>°.</td> <td>0</td> <td>0</td> <td>0.0</td> <td>0.0</td>	100	0		0	Q	0	.2.96	0.11	1996	•	0	•	•	0	°.	0	0	0.0	0.0
0 0	265	0		0	¢	•	0.29	0.07	1991	o	¢	o	0	0	°	0	0	1.56	1.57
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	000	c	\$	Ċ	¢	c	1.05	0.10	1998	0	٥	٥	0	¢	•	. 0	۰	2.72	2.33
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	000	• o	• •	• •	• •	0	0.21	0.09	1999	0	•	0	0	0	• •	•	0	1.75	0.39
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	000	0	0	0	ō	0	0.10	0.00	2000	0	0	0	¢	•	。 。	0	•	10.0	0.11
0 0 0 0 1.41 0.20 2002 301 1 1 0 <t< td=""><td>. 100</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0.05</td><td>0.02</td><td>2001</td><td>120</td><td>ò</td><td>0</td><td>0</td><td>-1</td><td>。 。</td><td>°</td><td>0</td><td>2.01</td><td>0.18</td></t<>	. 100	0	0	0	0	0	0.05	0.02	2001	120	ò	0	0	-1	。 。	°	0	2.01	0.18
600 1 0 1.07 0.06 2003 0 <t< td=""><td>200</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1.4.1</td><td>0.20</td><td>2002</td><td>301</td><td>ы</td><td>e</td><td>0</td><td>0</td><td>0</td><td>٥</td><td>0</td><td>2.83</td><td>0.03</td></t<>	200	0	0	0	0	0	1.4.1	0.20	2002	301	ы	e	0	0	0	٥	0	2.83	0.03
300 0 1 0 3.39 0.40 2004 260 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 1 0	100	609	۲	0	r,	0	1.07	0.06	2003	٥	٥	۰	•	0	。 。	0	٥	5.65	0.09
300 0 1 0 1.67 0.16 2005 176 0 0 1 1 0 0 2.57 500 0 1 0 1 2.31 0.09 2006 346 0 0 0 0 0 0 0 1.05 600 0 0 0 0 0 0 0 0 0 1.05 600 0 0 0 0 0 0 0 0 1.05 600 0 0 0 0 0 0 0 0 1 0 1.05 900 0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 1.155 900 0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 0 0 1 1 1 1 1 1 1 1 1	400	005	0	0	e	0	3.39	0.40	2004	260	0	¢	0	•	0 0	°	ы	0.85	10.01
500 0 1 0 1 2.31 0.09 2006 366 0 0 1 0	005	300	-	0	**1	٥	1.67	0.16	2005	176	٥	0	<u>,</u>	¢	н н	°	0	2.57	00.00
600 0 0 0 0 0 0 1 0 1.56 600 0 0 2 2.07 0.09 2008 0 0 0 0 0 0 0 0 1.56 600 0 0 0 0 0 0 0 0 0 0 0 0 1.73 900 0 0 0 0 0 0 0 0 0 0 1.73 900 0 0 0 0 0 0 0 0 0 0 0 1.73 900 0 0 0 0 0 0 0 0 0 1.73 1200 0	006	200	Ĩ,	-	0	H	2.31	0.09	2006	366	0	٥	-	•	。 。	•	0	1.03	0.00
600 0 0 2 2.07 0.09 2008 0 1 <t< td=""><td>002</td><td>609</td><td></td><td>٥</td><td>0</td><td>2</td><td>2.66</td><td>0.16</td><td>2007</td><td>80</td><td>•</td><td>¢</td><td>¢</td><td>٥</td><td>0 0</td><td></td><td>0</td><td>1.56</td><td>0.00</td></t<>	002	609		٥	0	2	2.66	0.16	2007	80	•	¢	¢	٥	0 0		0	1.56	0.00
400 0 0 2 2:03 0:06 2009 0 <t< td=""><td>008</td><td>606</td><td>0</td><td>0</td><td>•</td><td>2</td><td>2.07</td><td>60.0</td><td>2008</td><td>¢</td><td>¢</td><td>¢</td><td>•</td><td>0</td><td>0</td><td>•</td><td>0</td><td>2.55</td><td></td></t<>	008	606	0	0	•	2	2.07	60.0	2008	¢	¢	¢	•	0	0	•	0	2.55	
900 0 3 2.45 0.03 2010 0	600	600	0	0	0	~2	2.03	0.06	2009	0	0	0	•	0	0 0	°	0	1.73	
900 0 0 0 3 1.72 0.02 2011 0 0 0 0 0 0 0 0 0 0 0.39 1200 0 0 0 4 2.13 0.01 2012 0 0 0 0 0 0 0 0 0 0.57 900 0 0 3 2.79 0.01 2013 0 0 0 0 0 0 0 0 0 1.37 	010	005	-	٥	0	'n	2.45	0.03	2010	•	0	0	0	0	•	°	٥	7.98	
1200 0 0 0 4 2.13 0.01 2012 0 0 0 0 0 0 0 0 0 0 0.57 900 0 0 0 3 2.79 0.01 2013 0 0 0 0 0 0 0 0 1.37 	011	006		0	0	'n	1.72	0.02	2011	•	¢	•	¢	o	•	•		0.39	
900 0 0 0 3 2.79 0.01 2013 0 0 0 0 0 0 0 0 0 1.37 	012	1200	•	٥	0	4	2.13	0.01	2012	٥	•	ο.	0	٥	0	•		0.57	
7400 1 1 3 20 TOTAL	013	006			•		2.79	0.01	2013	٥	٥	۰	۰	0		-		1.37	0.01
	0746	2400		1	i m	No.			TOTAL	1303	-	-	r.	r.	-	-1	~		

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DM: High Case (6) Appendix Commissioning Year of Each Power Plant (Case-SL/GS)

Northern Region

Southern Region

Central Region

8A-58

Appendix Commissioning Year of Each Power Plant (Case-SS/GS) DM: High Case (8) Southern Region	TABLE 5.1.2 ADDITION UNITS AFTER INTERCONNE TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION 	LOLP LOLP HD01 LOLP	0 0.0 0.23 1993 0						2,13 2003 600 0 0 2 0 0.87	3.24 5.2004 300 1 0 0 0 2.54 0.12 200 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.03 2006 800 0 1 0 2 2.11 0.08	3.41 0.16 2007 600 0 0 0 2 2.33 0.05 cVV V V V V V V V V	2008 600 0 0 0 2 2.30 0.06	2009 300 0 0 0 1 4.31 0.18 2009 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 2.440 0.101 2011 7200 0 0 0 4 3.82 0.02 2012 0 0 0 0 0 0 0	1 3.05 0.01 2013		HSON: Son La	NEW: New G. C/C NEW+: New Coal HAN: An Khe HSON: Son Con2 HRAO: Rao Duan HTHU: Thuong Kon Tum
Appe Northern Region	DITION UNITS AFTER INTERCOMMECTION C	HBAN HCUA HSON HSON UCUA I HDAX HSON HSON HSON HHOU 1000 HSON HSON HSON HOU 1000 HSON HSON HSON HOU 1000 HSON 100 HSON 400 400 400 400 400 400 400 400 400 40	0 0 0 0	0 0 0	0		0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0	600 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	00					 7505 1 1 1 1 1 1 1 1 1 2 1	HBAN: Ban Mai HDAI: Dai Thi HCUA: Cua Dat	COUA: Quan Ninh

8A-59

				brt	югл	Northern Region	5								Sout	Southern Region	Reg	, oi							Cent	Central Region	Regiu	ы Б			
TABLE S,	5,1,1	LIGOV	ADDITION UNITS AFTER INTERCONNECTION OF NORTH	STINU	AFTE	NI R	TERCO	NNEC.	TION	OF N	октн		TABLE	5.1.2	.IGGA	TION	UNITS	3 AFT	ADDITION UNITS AFTER INTERCONNE	RCONNE	TABLE	5.1.3	ADD	TION	UNE	S AF	ER II	NTERC	CONNEC	ADDITION UNITS AFTER INTERCONNECTION OF CENTER	DF CEN
NAME :	H	HBAN	HCUA	HSOK	1 SON	NOSH	NOSH	NOSH HSON	ON CQUA		LOLP		NAME :	CH	NOGH			1	LOLP	L	NAME :	<u> </u>	HSE H	HBUD HSE		N H H	- NOSH	H8A0	, DHY H	101	LOLP
CAP : VEAR C	3 CAP	350 250	105	009	605	009	9009	600 6(600 30	1 Z 1 00 2 00 2 00	MAINT NOMNT CDAYS/YEAR)	NOMNT YEAR)	CAP.: Year	UL I	100E	200	300	1 2	MAINT NOMNT (DAYS/YEAR)	NOMNT YEAR)	CAP.1 YEAR	CAP	220	м 6	368 368	116	ŝ	ŝ	260 260	MAINT CDAYS	AINT NOMNT (DAYS/YEAR)
£65T	0	0	0	0	0	0	•	o,	0		0.0	0.23	1993	0	0	0	00		0.17 0	0.39	1993	00	•	00	• •	0 0 0 0	• •	00	00	36.52 57.06	36.51 47.15
1994	• •	0 0	00	00	• •	00	0 0	0 0	• •	0 0	0.45	64.0 07.1	1995	> 0	> 0					0.02	1995	• •	• •	• •	0		-	-	0	0.0	
1996						> • • •	000				1.05	1.95	1997	्००	00	00				0.12 0.07	1995	• •	00	00	• •	00	0 0 0 0	00	00	1.56	1.57
	,											40 •	1001	c	c	c	- -	-	1.12 0	0.10	1998	0	٥	ø	0	0	0	•	0	2.72	2.33
1998	•	0 (00	•	• •	ວຸດ	o 0	2 0	.		0.96	1.75	1999		0	. 0				0.09	1999	•	0	0	0	0	0 0	0	0	1.45	
2000) c	,					0	, 0	• •		0.89	1.08	2000	0	0	0				0.01	2000	0	0	0	o		-		0	0.01	
2001	. 0	0				0	•	0	0		1.21	1.45	2001	0	0	•	。 。	° o		0.03	2001	120	•	٥	٥			-	0	2.15	
2002	¢.	•		0 0	0	٥	•	٥	٥		1.86	1.96	2002	0	۰ `	o			1.21 0	0.13	2002	100	-1	-1	0	ŏ .	0	•	0	0.02	*0-0
. 2004	c	¢	a	0	0	0	ġ	٥	. 0	. 0	2.03	2.07	2003	600	0	0	N N			0.12	2003	۰	٥	•	0		-	•	¢	2.92	
1004	600				•	0	0	0	0	N	1.95	1.34	2004	٥	0	0	•	й 0		0.34	2004	260	٥	•	•	-			r	0.03	
2005	•	0	•		•	0	0	۰	ò		2.67	1.70	2005	006	-1	•				0.11	2005	176	0	• •	ο.			-	0 0	\$. S \$	
2006	550	0		0 0 0 0	••	о с	0.0	0 0	0 0		2.91	1,13	2006	200	0 0	r 0	- " - 0	9 44 9 44	1.92	0110	2002	080	0.0	0	10	> o	, o , o	,	00	0.88	0.0
2002	200	>		~	.	3 .	>	۰ ۲	,		5				•																
2008	600	0	a	0	•	0	•	•	٥	₽.	3.37	0.70	2008	009	0	0	•	ы - ы -	2,52	50.05	2008	0 0	0 0	0 0	• •	0 (0 (0 (o 'q	0 <	8.21	0.00
2009	950	-1	0	。 。	•	0	0	o	0		2.92	0.15	2009	006	0 1	0 0				0.00	5002	> <	•	, o	> <				,	0.10 8	
2010	600	0				່	0 9	\$ (0 (8.56 9.50	90°0	50102	009	> <	• •		4 F		000	2013	, o) 0	, o	, o				• •	0.56	
2011	009	o o	• •	 	0 0 0	4 O	, c	o o	o o		2.54	0.02	2012	006	• •	• •				0.01	2012	0	٥	0	0	ō	0		0	1.39	
	1305	0	•		°.	¢	¢	· 4	Ö	2	3.36	0.01	2013	300	٥	0	0	. н	4.73 0	0.03	2013	•	o	o	0	Ģ	0 0	ç	•	3,78	0.01
TOTAL	6705	-	-	1 1	1	1	-	-	0	10			TOTAL	6500			3 17				TOTAL	1303	-	-					-		
	-NEGU		LOLM' BAA MAA BAAI: DAA Thi HOld: Cua Dat		Dai T			Cua Da	1.	HSON: Son	Son La			IVOH	Ba	HDA1: Dai Ninh		HDON: Dong Nai4	Nai4		HSE: S	Se San#3		non Long	1 Cuop	HBUO: Buon Cuop : HSE: SeSan#4	SeSal	17	T	HPLI: Pieî Krung	Bun
			ī			:																			•	į	1				5

SonLa(S) 2yrDelayed
(Case-SS/GS)
Power Plant
Year of Each I
Commissioning Ye
Appendix

100 C

AN AN

Northern Region

TABLE 5.1.1 ADDITION UNITS AFTER INTERCONNECTION OF NORTH

TABLE 5.1.2 ADDITION UNITS AFTER INTERCONNE TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER

Central Region

Southern Region

0.01 0.0 2.33 0.18 0.0 0.01 36.51 47.15 0.0 0.10 0.01 0.02 0.00 0.01 0.01 0.35 0.04 MAINT NOMNT (DAYS/YEAR) HSON: Son La -----LOLP -------1.63 2.37 4.32 4.67 3.41 1.24 36.52 57.06 1.56 0.48 1.22 0.67 0.0 0.0 нтни 260 ł HDAI: Dai Thi HCUA: Cua Dat ŝ HRAO ------HSON 116 HAN HPLI 366 HSE HBUO 220 HSE HBAN: Ban Mai 1303 CAP. TOTAL NAME : 2010 2013 2000 2001 2002 2005 2006 2012 CAP.: 2008 2009 YEAR 1998 2003 2004 2007 1993 766 995 996 1997 999 0.06 0.03 0.05 0.02 0.01 0.39 0.17 0.12 0.10 DAI NEW 0.02 01.0 0.01 0.02 11.0 0.16 0.09 0.22 MAINT NOMNT 1 3 3 1 (DAYS/YEAR) LOLP HDA1: Dai Ninh HDON: Dong Nai4 2.57 4.30 2.27 2.85 0.84 1.59 1.94 2.38 0.00 1.12 0.17 0.01 15.0 0.20 0.04 0.05 0,86 . 66 3.01 3 17 t 1 300 0 1 M U N + 300 NOOH г г 200 0 HDAI 300 00 M 6500 600 006 009 600 900 ------CAP TOTAL NAME : 2010 2012 2012 2013 CAP : 2001 2003 2005 2005 2005 2008 2009 YEAR 5661 966 2000 466 19.95 1997 966 666 0.05 0.00 1.39 0.66 0.15 0.23 1.95 1.89 MAINT NOMNT 0.79 1.70 1.89 1.95 53 1.08 1.50 1.99 .28 1.92 (DAYS/YEAR) HRAD: Rao Quan HTHU: Thuong Kon Tum Loup 3.02 2.58 2.59 3.44 2.58 1.59 1.60 1.67 2.62 3.21 1.06 1.62 5.07 0.45 6.95 0.0 HSE: Se San#3 HBUC: Buon Cuop HSE: SeSan#4 HPL1: Plei Krung 0 0 400 JA HSON HSON СФИА ННОЙ NOHH 203 1 005 NOSH 480 -NOSH -4.80 HSON 04.3 HCUA 105 -HDAI ~* HBAN 350 TOTAL 7005 480 1080 1485 600 1130 480 550 609 1111115511 CAP. CAP.: 2008 2009 2010 2011 2012 NAME : 2008 2005 2005 2005 2013 YEAR 1993 1996 1995 1996 2000 2000 2002 998

COUA: Quan Ninh

NEW: New G. C/C NEW+: New Coal

HSON: Son Con2

HAN: An Khe

Appendix Commissioning Year of Each Power Plant (Case-SS/GS)

Northern Region

Southern Region

TABLE 5.1.3 ADDITION UNITS AFTER INTERCONNECTION OF CENTER

Central Region

LOLP=3. 0% []]

NAWE:	HBAN	6	- AUDH	SH NOSH	HSON	NOSH	NOSH	COUA	ННОГ	ЛОНН	5	LOLP	ı z	NAME :	L H	HDAI	MUN NO	+3 W N		TOLP	~	NAME :	-	HSE HSE	HBU0 HBU0	114H 32	HAN LI HAN	NOSH	ARA L	HTHO I		LOLP	
CAP.:		250	101	480	1.084	1 I	480 480	0000	400	400	MAINT AAINT CDAYS	T NOMNT			GAP.	000 000	200 30	300		MAINT NOMNT (DAYS/YEAR)	MOMNT MARY	CAP.: YEAR	CAP.	220	81 81	366	120 116	6 60	8	260	1	~ 1	VOMNT YEAR
				0	0	0	i		0	0	1	1	1 52.0	1993	0	0	0	0		0.17	0 49 0 0	1001	00	00	00	00	00	- 0 0 0	00	00	36.52		36.51
1993). ()	, 0	• •	. 0	0	. 0	0	•		÷		7661	0	0	0	• •		0,00		1004	> c	0	0	. 0	, o	。 。	, o , o				0.0
4600	5 0 5 0	, ~		0	ò	0	0	0	0 .	0		÷		1995	0	0 0	0 0			201	0.10	1996	• •	0	• •	• •	0	0	• •	0	0.0		0.0
		000	00	00	00	00	00	00	00	••	1.03		2.20 1	1997	00	• •	00	50		0 - 40	60.0	1997	0	0	0	٥	0	0	0	•	1.56		1.58
		, ,			•										•	<	~	۔ د	0	.66	0,07	1998	o	۰	0	0	٥	。 。	0	°	2.73		2.33
1998	0	° ~	•	0	o	¢	0	0	0 0	•				1770	,	,	, , ,	, c		61.0	6.09	1999	0	¢	0	0	0	ر ہ	0	°			0.40
	. 0	0	ہ د	¢	o	٥	o	0	9 0	•				1994	,	•	> c			0.02	0.0	2000	¢	0	0	0	0	0 0	0	。 。	0.45		0.12
0000	ō	0	•	0	0	0	٥	•	0	°				2000	,		, c	• •		14	0.04	2001	120	0	0	0	r1	0	0 0	。 。			0.16
2001	0	0	0	•	۰	0	•	•	0 ·	٥ ٥ م	1.29		2 0 0 F	1002	0	00	. 0	• •	0	56.0	0.13	2002	220	ल	0	0	•	0	0				0.11
2002	0	ິ. ວ	0	0	0	0	•	o	ġ	~										1			č		•	<	c	د د		·	Ģ		0 I 2
		-	•	•	<	4	<	c	с с	0	4.77			2003	•	٥	o	¢		6.25	1.64	2003	1		-1 4	,				> <			
2003	ò	0	0	0	0				, (, (2004	600	0	0	~	0 N	66.	1-41	2004	0		0	•	•	0	0				
2004	0	بر ہ	0	0	o ·	o_ I	5	.	, . 	> <			4.84	2005	300	0	0	•*	.9 0	6.32	C.93	2002	436		0	0	0	-	н	н о	5.07		6.03
2005	001	。 。	。 。	ò	0	0	5	5 1	 					2006	609	r	0	0	ф ст	.15	0.34	2006	366		0	-1	0	ó	0	0 0			0.00
2006	000		0 ¢	• •	0 0	o o	00		 				1.61	2007	609	٥	0	0	พ	.62	0.30	2007	ο.	•	ø	0	o	с 0	0	0			10.0
1002	202	\$, ·	•	•	•									-	•	•	4	•	07 0	• • •	9008	c	a	0	0	0	0	0	•	C.		00
8000	010	5	0	0	••	o	¢	o	°	ç	0 8.57		0.35 2	2008	300	0.0	5,	> <			1 E E - O	0000	08	• •	0	0	0	0	- F	0	9.29		0.02
0000	780		0	0	ō	Ή	0	, D	۲ ۲	0 0				2009	008	.	4 6	.		8	0.26	2010	0		0	0	0	0	0	0 0			40.0
2010	780	0	0	0	0	o	-	0		0				2010		•	.				0.09	2011	0	0	0	0	0	о 0	0	0.0	3.97		10.01
2011		 	00	0.0	• •	00	• •	40	о.н	. 0 . 4	0 8.7		40.0 40.0	2012	006	, ,	00		- - - - - - - - - - - - - -	2.00	00	2012	•		0	o	٥	•	0	° 0	m		0.03
	·.	÷.		•	0	•	. 0	0	N	н 0	1 8.7	m	0.01 2	2013	\$00	o	•	0	ย (N	8.98	0.09	2013	0	0	`o	.0	0	0	0	0 0	11.54		0.14
	- 1		1				1						1	TOTAL	6200		-	n 1	16			TOTAL	1303	r1	ч	H	ы	-1		+ +			
TOTAL	6250	а.	0	ิ 0	H	-	нΪ						•						1														
	: 1 1														Ŧ	HDAL: Dai Ninh	ai Ni		HDON: Dong Nai4	ick Su	7	÷ iii SH	HSE: Se San#3		HBUO: Buon Cuop	ы Сic		ŝ	¥urs.	Ē.	HSE: SeSan#4 HPLI: Plei Krung	Krung	
																•																-	

COUA: Quan Ninh

Case Item	Case- North :	① SL/G South:		Gr.Total cost(M\$)	Case- North :	② SL/(South:	GS Center	Gr.Total cost(M\$)
Total M\$	4, 931	8, 155	1, 649	14, 735	5,060	8, 293	1, 635	14, 988
Capital	3, 886	3, 617	1, 507	9, 010	4, 010	3, 867	1, 492	9, 369
Fuel w/o	372	1, 314	86	1, 772	349	1, 285	86	1, 720
0 & M	223	453	16	692	215	459	16	690
Variable T. P. Repl	389 61	2, 581 190	40	3, 010 251	421 65	2, 506 176	41	2, 968 241
lolp D/y	1. 84	1.54	6, 91	3. 43day	1.95	1.49	6, 37	3. 27da
EUE(GWh)	168.4	105.0	253. 3	527GWh	179.9	100.1	220. 1	500GW
Case Item	Case North	-3 SS/ ; South	GL Center	Gr.Total cost(M\$)	Case North	-④ SS/ South	GS Center	Gr.Tota cost(M\$
Total M\$	4, 534	8, 191	1, 637	14, 362	4, 791	8, 290	1,644	14, 725
Capital	3, 172	3, 640	1, 507	8, 326	3, 347	3, 883	1, 507	8, 737
Fuel	422	1, 316	86	1, 824	436	1, 276	- 86	1, 798
0 & M	249	456	16	721	259	456	16	731
Variable T.P.Repl	617 74		28	3, 226 265	661 88	2, 499 176	35	3, 195 264
LOLP D/y	1.85	1.53	5.97	3. 12day	1.82	1. 38	6.04	3. 08da
EUE (GWh)	167.7	104.4	220.3	493GWh	165.5	93.8	208.1	467GV
L	With	out Son	La					
Case	Case	-01 NS/	GL	Gr. Total		-02 NS/		Gr. Tota

	14 A							
Case Item	Case-(North)1 NS/GI South	Center	Gr.Total cost(M\$)	Case-(North)2 NS/G South	S Center	Gr. Tota cost (M\$)
Total M\$	5, 166	8, 178	1, 638	14, 982	5, 203	8, 578	1, 649	15, 430
Capital	2, 902	3, 706	1, 487	8, 095	2, 900	4, 130	1, 497	8, 527
Fuel	553	1, 276	87	1, 916	575	1 , 26 5	88	1, 928
0 & M	310	444	16	770	322	453	16	791
Variable T.P.Repl	1, 281 120	2, 562 190		3, 891 310		2, 542 188		3, 873 311
LOLP D/y	1.83	1.26	5.86	2. 99day	1.72	1.45	6.22	3. 13da
EUE (GWh)	177.4	82.5	201.5	461GWh	174.4	92.3	211.5	478GW

111CE ULUEL. 30/UL S0/UL S0/UL S0/UL S0/UL

Case-(5) SL/GL Gr. Total Case-6 SL/GS Case Gr. Total Item South : Center cost(M\$) South : Center North : North : cost(M\$) Total M\$ 17,025 9,736 5.770 9.607 1.648 5,871 1,671 17, 278 Capital 4, 411 4, 184 1.507 10, 102 4,410 4,470 1,507 10, 387 Fuel 411 1.560 90 2,061 468 1,495 94 2,057 0 & M 245 539 17 801 274 529 17 820 611 3.731Variable 3,086 34 619 3,024 53 3,696 92 238 T. P. Repl 218 330 100 318 LOLP D/y 1.93 1.35 6.56 3. 28dav 2.09 1.69 8.81 4. 19day **EUE(GWh)** 175.2 108.4 233.5 517GWh 197.6 132.8 : 399.4 730GWh Case. Case-⑦ SS/GL Gr. Total Case-® SS/GS Gr. Total South : Center Item North : cost(M\$) South : Center North : cost(M\$) Total M\$ 5,290 9,584 : 1,651 16,525 5,405 9,715 1,670 16,790 Capital 3,614 4, 181 1.507 9.302 3.695 4,464 1.500 9.659 Fuel 469 : 1.551 91 2.111 499 1.497 96 2.092 0 & M 276 535 17 828 292 527 836 17 Variable 830 3, 082 36 3, 948 812 3,018 3, 887 57T.P.Repl 101 235 336 209 316 107 LOLP D/y 1.95 1.47 6.68 3. 37day 2.08 1.82 8.50 4. 13dav

Demand: High

All costs are discounted value in million US\$ and include IDC. Fuel and O&M cost are total discounted value from 1993 through 2013. Capital cost is total value of all power plants from 1996 through 2013.

525GWh

191.7

138.8

395.2

726GWb

EUE(GWh)

174.3

105.7 :

244.5

Variavble : Variable cost from 2014 through 2060 T.P.Repl : Cost of Thermal Plant Replacement from 2014 through 2060

Delayed Son La 2 years

Case Item	Case North	-9 DSL, South	/GS Center	Gr.Total cost(M\$)	Case North	-① DSS South	/GS Center	Gr.Total cost(M\$)
Total M\$	5, 333	8, 278	1, 634	15, 245	5, 091	8, 286	1, 645	15, 022
Capital	3, 843	3, 883	1, 497	9, 223	3, 329	3, 883	1, 507	8, 719
Fue1	508	1, 269	86	1, 863	532	1, 275	86	1, 893
0 & M	288	454	16	758	303	456	16	775
Variable T. P. Repl		2, 497 175		3, 135 266		2, 496 176		3, 349 286
LOLP D/y	1. 87	1.40	6.83	3. 37day	1.86	1.41	5.98	3. 08day
EUE (GWh)	188.1	92. 7	243.9	525GWh	182. 4	92.0	204. 2	478GWh

LOLP=3, 0%

Case Item	Case North	-① SS/ South	GS(3%) Center	Gr.Total cost(M \$)
Total M\$	4, 545	8, 040	1, 660	14, 245
Capital	3, 022	3, 634	1, 464	8, 120
Fuel	478	1, 316	95	1, 889
0 & M	262	453	17	732
Variable T. P. Repl	707 76	2, 478 159	84	3, 269 235
LOLP D/y	4.72	3. 70	8.48	5. 63day
EUB (GWh)	409.0	287.0	337.0	1, 033GWh

All costs are discounted value in million US\$ and include IDC. Fuel and O&M cost are total discounted value from 1993 through 2013. Capital cost is total value of all power plants from 1996 through 2013.

Oriavble : Variable cost from 2014 through 2060 T.P.Repl : Cost of Thermal Plant Replacement from 2014 through 2060

Disbursement Schedule of On-Going Power Plants L.C. (MILLION US\$)

								(mit DDI	<i>π</i> τουφ/
	1993	1994	1995	1996	1997	1998	1999	2000	a second s
PhaLaiB(coal)					10.1	51.1	93.9	39.9	195.0
Ba Ria(C/C)		0.8	4.3	7.8	3.3				16.3
New Gas(C/C)		4.2	20.9	38.5	16.4				80.0
New Gas(C/C)			2.1	10.5	19.3	8.2			40.0
Phu My(Gas)				8, 8	44.5	81.9	34.8		170.0
Ham Thuan(H)			6.2	15.2	47.2	80.8	53.9	15.1	218.4
Da Mi(H)									0.0
Song Hinh(H)	1.2	3.1	9.5	16.3	10.9	3.0			44.0
Yaly#1,#2(H)		4.1	10.1	31.1	53.3	35.6	9.9	1	144. 0
Yaly#3,#4(H)			1.7	4.2	13.0	22.2	14.8	4.1	60. 0
Sub Total	1.2	12.1	54.7	132.5	217.9	282.7	207.4	59.1	967.7

(MILLION US\$)

								1.1.1	· ·
F.C.								(MILLI	on US\$)
	1993	1994	1995	1996	1997	1998	1999	2000	Total
PhaLaiB(coal)					30.4	153.2	281.8	119.7	585.0
Ba Ria(C/C)		2.5	12.8	23.5	10.0				48.8
New Gas(C/C)		12.5	62.8	115.6	49.1				240.0
New Gas(C/C)			6.2	31.4	57.8	24.5			120.0
Phu My(Gas)				26.5	133.5	245.7	104.3		510.0
Ham Thuan(H)			9.3	22.9	70.8	121.2	80.9	22.6	327.6
Da Mi(H)	· ·								0.0
Song Hinh(H)	1.9	4.6	14.3	24.4	16.3	4.6			66.0
Yaly#1,#2(H)		6.1	15.1	46.7	79.9	53.3	14.9		216.0
Yaly#3,#4(H)			2.5	6.3	19.5	33.3	22.2	6.2	90.0
Sub Total	1.9	25.7	123.0	297.3	467.2	635.7	504.1	148.5	2, 203. 4

Gross	Without	t IDC		•		• •		(MILLI	on US\$)
	1993	1994	1995	1996	1997	1998	1999	2000	Total
PhaLaiB(coal)	1				40.5	204.2	375.7	159.5	780.0
Ba Ria(C/C)		3.4	17.0	31.3	13.3				65.0
New Gas(C/C)	T	16.6	83.8	154.1	65.4				320.0
New Gas(C/C)			8.3	41.9	77.1	32.7			160.0
Phu My(Gas)				35.3	178.0	327.5	139.1		680.0
Ham Thuan(H)			15.4	38.1	118.0	202.0	134.8	37.7	546.0
Da Mi(H)									0.0
Song Hinh(H)	3.1	7.7	23.8	40.7	27.2	7.6			110.0
Yaly#1,#2(H)		10.2	25.1	77.8	133.2	88.9	24.8		360.0
Yaly#3,#4(H)			4.2	10.5	32.4	55.5	37.0	10.3	150.0
Grand Total	3.1	37.9	177.7	429.8	685.1	918.4	711.5	207.6	3, 171. 0

BY PLANT TYPE OF TOTAL SYSTEM TABLE 12.1.6.3 FIXED ORM COST (TOTAL)

Abelia

YEAR	NUCL	GAST	OILE	COAL	DSEL	GEOT	LNGP	COMB	HYDR	PUMP	TOTAL	COST
		531	1200	7651	1274	0	 0				10555	(CENT/KW) 1.00
993	0	771	1200	7842	1287	ŏ	ŏ	õ	0	õ	11112	0.93
994	0	779	1212	8038	1300	ő	ŏ	ō	ō	ō	11340	0.83
995	0		1224	8239	1313	ő	ő	ů 0	õ	o o	11574	0.76
996	0	787 795	1250	8445	1326	ŏ	ŏ	1669	o	ò	13483	0.80
	·											
998	0	803	1261	8656	1339	0	1146	2579	0	0	15784	0.84
999	Ð	738	1274	10284	1352	0	3542	2657	0	0	19848	0.95
000	0	582	1072	11989	920	o	3648	2736	0	0	20948	0.90
001	0	588	1083	12289	929	0	3758	2818	0	0	21465	0.82
002	0	594	1094	12596	938	0	3870	2903	0	0	21995	0,75
003	٥	600	1105	12911	948	0	3987	5980	0	0	25529	0.78
003	· 0	606	1116	16623	957	ō	4106	7699	0	0	31107	0.85
005	· õ	612	1127	20512	967	o	4229	7930	0	0	35377	0,87
006	ŏ	618		28146	977	ò	4356	B168	0	0	42265	0.93
2007	õ	624	ő	45134	986	¢	4487	8413	0	0	59645	1.19
	0	630	0	51732	996	0	4622	8665	0	0	66645	1.21
2008	0	637	ŏ	60694	1006	ō	4760	8925	0	0	76022	1.25
010	o o	643	ŏ	77932	1016	ō	4903	9193	0	0	93688	1.40
	0	649	ő	91966	2766	ō	5050	9469	0	0	109901	1.51
2011 2012	ŏ	656	ő	106653	2794	0	5202	9753	0	0	125057	1.56
2013	0	663	0	126249	2822	Ŷ	5358	10045	٥	, 0	145137	1.65
TOTAL	0	13905	15250	734580	28213	 0	67024	109603	0	0	968575	

(4) Case-SS/GS ($\times 10^{3}$ US\$)

TABLE 12,2.6.3 VARIABLE O&M COST (TOTAL) BY PLANT TYPE OF TOTAL SYSTEM

EAR	NUCL	GAST	OTLE	COAL	OSEL	GEOT	1.NGP	COMB	HYDR	PUMP	TOTAL	COST (CENT/KW)
993	0	7883	1587	0	2726	0	. 0	0	0	0	12196	1.14
994	0	2155	1	773	3212	٥	0	0	0	0	6141	0,51
995	0	5358	25	5271	88	0	0	0	0	0	10741	0.78
996	0	9782	654	6736	706	0	0	0	0	0	17878	1.18
997	0	4229	363	7378	744	0	0	10224	0	0	22938	1.36
998	· 0	5537	187	7090	493	0	1802	15475	0	0	30585	2.63
999	0	205	15	4796	11	· •	3283	15702	0	0	24012	1.15
000	0	34	1	7281	0	0	909	11760	0	0	19986	0.86
2001	0	44	1	9146	120	0	2112	17900	0	0	29325	1.12
2002	. 0	256	15	11556	24	0	3950	21267	0	0	37069	1.27
2003	. 0	294	19	13328	130	0	2738	39520	0	0	56029	1.71
2004	0	273	17.	16609	24	0	2647	49223	0	0	68792	1.88
2005 .	0	364	30	25279	58	0	2363	53292	0	0	81386	1.99
2006	0	245	. 0	44207	116	. 0	2490	55984	0	0	103042	2.26
2007	0	156	0	55274	90	. 0	1654	64449	0	0	121624	2.43
2008	0	140	0	69761	89	0	1183	68780	0	0	139953	2.54
2009	Ģ	230	0 -		125	0	1493	71167	0	0	163599	2.70
2010	٥	234	0	117476	180	0	1356	73259	0	0	192504	2,88
2011	0	223	. 0	143377	592	0	1230	75456	0	0	220878	3.04
2012	0	245	0	176229	491	0	1086	77767	0	0	255818	3.20
2013	· O	360	0	224561	1144	0	1385	80101	0	· 0	307552	3,50
TOTAL		38247	2916	1036713	11165		31682	801326	0		1922048	

Not Discounted

without IDC

(4) Case-SS/GS

 $(\times 10^{3}$ US\$)

TABLE	12.3.1.3	FUEL COST	(TOTAL)	BY PLANT TYPE OF NORTH	

YEAR	NUCL	GAST	OILE	COAL	DSEL	GEOT	LNGP	COMB	HYDR	PUMP	TOTAL	UNIT
1993	0	0	0	0	0	0						(CENT/KW)
994	ů	4	ŏ	2476	ŏ	0	0	0	0	0	0	0.0
995	ů.	ā	ő	15466	ŏ	-	0	0	0	0	2481	0.34
996	õ	13	ŏ	19656	0	0	0	0	0	0	15474	1.67
997	õ	22	0	21525	0	ő	0 0	· 0 0	0 0	0	19669 21547	2.01 2.16
998	0	22	0	21136	. 0	0	0	· 0	o	0	21158	
999	. 0	0	0	26088	ò	ō	ŏ	ő	ŏ	ŏ		2.14
000	0	0	ó	40101	· ő	õ	ŏ	0	ŏ	ŏ	26088	2.47
001	0	0	0	47267	ō	ŏ	õ	0	ŏ	ő	40101	3.49
002	0	0	0	56742	o	o	ů 0	ő	ŏ	õ	47267 56742	3.98 4.57
003	0	0	0	66941	0	0	0	0	٥	0	66941	5.16
004	0	٥	0	66964	0	0	0	Ō	0	ő	66964	4,52
005	0	0	0	90132	0	0	0	0	ů,	ŏ	90132	5,59
006	0	0	. 0	126622	0	0	0	-0	ò	ŏ	126622	6,96
007	0	0	0	125634	0	0	0	0	ō	õ	125634	
600	Û	0	0	129373	. 0	0	0	0	0	0	129373	5.78
009	0	0	0	133138	0	· 0	0	0	0	0	133138	5,41
010	0	0	0	142803	0	0	0	. 0	0	0	142803	5.26
011	0	0	0	142024	0	0	0	0	0	0.	142024	4.88
012	0	0	0	155669	0	0	0	0	٥	0	155669	4,79
013	0	0	0	206600	0	0	0	0	· o	. 0	206600	5.67
OTAL	0	70	0	1636353	0	0	0	 0	- 0	 0	1636424	

Not Discounted

without IDC

COST (CENT/KW	TOTAL	PUMP	HYDR	сомв	LNGP	GEOT	DSEL	COAL	OILE	GAST	NUCL	EAR
6.59	29697	. 0	0	0	0	. 0	1064	0	11607	17026	0	993
1.31	4788	0	0	0	0	0	0	0	7	4781	0	994
2.99	12317	٥	0	· 0	0	0	1	0	203	12113	0	995
5,42	26488	0	0	0	0	0	266	0	4822	21401	0	996
7.69	49242	. 0	0	37229	0	0	54	0	2687	9272	0	1997
10,24	83626	٥	, Ó	56462	13531	٥	111	0	1416	12106	0	998
10.41	83369	0	0	57312	25472	0	21	0	107	457	0	999
6.48	50523	0	0	43012	7423	0	0	0	9	79	0	2000
8,86	82330	0	0	65311	16906	0	0	0	11	102	0	2001
10.48	109189	0	0	77509	30984	0	٥	0	113	583	0	002
	166199	: 0	0	144241	21157	0	. 0	٥	138	663	D	2003
	200783	. 0	0	179738	20310	0	0	0	123	612	0	2004
13,33	227209	0	0	194575	18300	· •	0	13294	221	819	0	2005
	241237	0	0	204247	19330	0	0	17109	. 0	551	0	2006
14.70	301133	0	0	234915	12789	0	0	53080	0	349	0	2007
	366552	0	o	250702	9281	o	0	106254	0	314	0	2008
	453711	0	. 0	259402	11632	0	•	182162	0	516	0	2009
	549991	0	. 0	267041	10457	0	0	271972	0	520	0	2010
	658306	Û	Q	275038	9374	0	0	373400	. 0	495	. 0	2011
20.89	778332	.0	0	283481	8366	Û	0	485938	. 0	546	0	2012
21.88	900562	0	0	291988	10667	· . O	0	597108	0	800	· •	2013
	5375580	0	0	2922200	245979	0	1518	2100316	21462	84104	0	TOTAL

TABLE 12.3.2.3 FUEL COST (TOTAL) BY PLANT TYPE OF SOUTH

Case-SS/GS ($\times 10^{3}$ US\$)

EAR	NUCL	GAST	OTLE	COAL	DSEL	GEOT	LNGP	COMB	HYDR	PUMP	TOTAL	COST (CENT/KW)
	0	0		0	30581	0	0	0	0	0	30581	39,16
993	0	ŏ	ŏ	ŏ	36547	0	ō	0	0	0	38547	40.17
994	ő	0	ŏ	ŏ	1050	ō	ò	Ó	0	0	1050	3.35
995 996	ů ů	0	ő	ŏ	7940	ō	0	0	0	0	7940	16.87
990 997	°	õ	ů.	ŏ	8825	0	0	0	0	0	8825	18.05
998	. 0	0	0	0	5697	٥	٥	0	0	0	5697	8,02
999 999	0	ŏ	0	ō	92	0	0	0	• 0	0	92	0.04
000	ő	ŏ	ō	Ó	3	0	0	0	٥	0	3	0.00
000	ő	õ	ŏ	ò	1445	0	0	0	0	0	1445	0.29
002	ŏ	, õ	ō	ō	290	0	0	0	0	0	290	0.05
0.07	0	0	. 0		1565	٥	0	ò	0	0	1565	0.24
003 004	Ŏ	ŏ	. 0	ō	285	0	0	· `0	0	0	285	0.04
005	. 0	õ	. 0	ō	692	0	0	0	0	0	692	0.09
005	. 0	ŏ	ō	ō	1387	· o	0	0	0	0	1387	0.15
007	0	· o	ŏ	0	1083	0	0	0	0	٥	1083	0.11
008	Ō	0	· 0	0	1071	0	0	٥	0	0	1071	0.11
009	0	ő	ō	ů.	1505	0	0	0	0	0	1505	
010	õ	· õ	ō	Ō	2159	0	0	0	0	0	2159	0.21
011	õ	õ	ō	0	7108	0	0	. 0	0	0	7108	
012	ŏ	0	0	0	5891	٥	0	0	٥	0	5891	0.58
2013	0	Ç.	•	0	13734	. 0	0	0	0	0	13734	1.33
 IOTAL		 0	0		130948	0	0	0	0	0	130948	

TABLE 12.3.3.3 FUEL COST (TOTAL) BY PLANT TYPE OF CENTER

A 100

Not Discounted

EAR	NUCL	GAST	OILE	COAL	DSEL	GEOT	LNGP	COMB	HYDR	PUMP	TOTAL	
993	 0	17026	11607		31645	0	0	0	0	0	60278	5.66
			7		38547	0	0	0	٥	0	45815	3.82
1995	ő		203	15466	1051	0	0	0	0	0	28841	2.11
1996	ö		4822	19656	8206	Ď	0	0	0	0	54097	3,57
1997	ŏ		2687	21525	687B	0	0	37229	٥	0	79613	4.72
1998	. 0	12128	1416	21136	5809	٥	13531	56462			110481	5.89
1999	o	457	107	26088	113	0	25472	57312	. 0		109549	
2000		79	. 9	40101	3	0	7423	43012	0	0	90627	
2001	0	102	11	47267	1445	0	16906	65311	0	0	131042	
2002	0		113	56742	290	0	30984	77509	0	0	166220	5,68
2003	0	663	138	66941	1565	٥	21157	144241		0	234704	
2004	ō	612	123	66964	285	. 0	20310	179738	0	. •	268032	
2005	0	819	221	103426	692	0	18300	194575	0	0	318032	
2006	0	551	0	143730	1387	0	19330	204247	0	0	369246	
2007	· o		0	178713	1083	0	12789	234915	٥	0	427850	8.54
2008	. 0	314	٥	235627	1071	0	9281	250702	Q	0	496995	
2009	. 0	516	0	315299	1505	0	11632	259402	0	. 0	588354	
2010	0		. 0	414776	2159	0	10457	267041	0	0	694953	
2011	ō	495		515424	7108	`O	9374	275038	0	0	807438	
2012	0		0	641607	5891	0	8366	283481	0	0	939891	11.76
2013	0	800	0	803708	13734	. 0	10667	291988	0	0	1120894	
		84174	21462	3736669	132465	•••••••	245979	2922200	0		7142951	

ABLE 12.3.6.3 FUEL COST (TOTAL) BY PLANT TYPE OF TOTAL SYSTEM

Case-SS/GS $(\times 10^{3}US\$)$

TOTA	PUMP	HYDR	сомв	LNGP	GEOT	DSEL	COAL	OILE	GAST	NUCL	re a r
	 0	0	0	0	0	0	0	 0	 0	0	993
	0	0	0	0	0	0	• 0	0	0	õ	994
	0	· 0	0	0	0	0	0	0	0	0	1995
	0	0	0	0	0	0	٥	0	0	0	1996
	0	0	• •	٥	0	Ŷ	0	0	0	. 0	1997
1110	0	11105	0	0	0	0	0	0	0	0	1998
5274	0	52749	0	0	0	0	0	0	0	٥	1999
11351	٥	100251	0	0	0	0	13260	0	0	0	2000
24635	0	190889	٥	0	0	0	55467	0	0	0	2001
31285	0	205729	0	0	0	0	107121	0	0	. O	2002
40708	٥	255386	0	o	0	O	151696	. 0	0	0	2003
42626	0	160409	0	0	0.	0	265853	0	0	0	2004
37640	0	134565	0	. 🗘	0	· 0	241843	0	0	0 .	2005
15280	0	77415	0	. 0	0	0	75391	0	0	0	2006
9264	. 0	61339	0	0	0	0	31310	0	0	0	2007
12757	0	79474	0	í o	0	0	48096	0	. 0	0	2008
13565	0	101778	0	• 0	. 0	0	33877	0	0	. 0	2009
13561	0	65044	0	0	Ο.	0	70571	0	0	0	2010
12951	0	21110	0	. 0	0	•	108405	0	0	· 0	2011
4085	0	2524	0	0	0	0	38331	0	0	. 0	2012
<u>.</u>	0	0	0	0	. 0	0	0	٥	0	0	2013
276098	0	1519762	0	0	0	0	1241221		0	0	TOTAL

TABLE 12.4.5 CAPITAL COST BY PLANT TYPE OF NORTH

Discounted

TOTA	PUMP	HYDR	COMB	LNGP	GEOT	DSEL	COAL	OILE	GAST	NUCL	EAR
	0	0	0	0	0		0	o	0	 0	993
	Q	0	0	0	0	0	0	0	0	0	994
	0	0	0	0	0	0	0	0	0	0	995
	0	0	ο.	0	. 0	0	0	0	0	o	996
	٥	٥.	. 0	0	0	0	0	0	0	0	997
	0	0	. 0	0	. 0	0	0	0	0	0	998
2861	0	9945	18670	0	0	0	0	0	0	0	999
11233	0	25755	86584	0	0	0	· 0	0	0	0	2000
22991	Q	62398	155466	0	0	0	12055	0	0	0	2001
24951	0	102145	96950	0	0	•	50425	0	0	Ô	2002
19953	0	82870	19282	0	• • •	0	97383	0	Û	0	2003
16200	0	33153	0	• •	0	0	128849	0	0	0	2004
22585	. 0	5590	0	· •	0	0	220267	0	0	0	005
25295	0	0	0	0	0	0	252998	0	0	0	2006
26130	٥	• •	0	0	0	0	261308	0	0	0	2007
28564	. 0	o	· 0	0	0	٥	285649	0	0	·. 0	2008
2654	0	0.4	0	0	0	• •	265440	0	. 0	0	2009
1891	•	0	. 0	0	0	. 0	189150	. O	0	· 0	2010
7821	0	·· 0	0	0	0	0	78299	0	0	0	2011
127	. 0	0 · ·	. 0	0	0	Ó	12777	0	. 0	0	2012
	· · 0	• 0	0	•	•	. [.] o .	0	0	0	. 0	2013
25534	0	321855	376952		0		1854598	 0	 0		TOTAL

TABLE 12.4.4 CAPITAL COST BY PLANT TYPE OF SOUTH

Case-SS/GS

 $(\times 10^{3}$ US\$)

TOTA	PUMP	HYDR	COMB	LNGP	GEOT	DSEL	COAL	OILE	GAST	NUCL	EAR
	0	0	0	0	0	0	0	 0	0		993
1	٥	0	0	0	0	0	0	0	ò	õ	994
972	0	9729	0	0	0	0	0	0	ò	· 0	995
3000	0	30007	0	0	0	. 0	0	0	0	0	996
7058	0	70580	٥	0	0	0	0	0	0	0	1997
13742	٥	137426	0	0	0	0	0	0	0	٥	1998
14430	0	144305	0	0	0	٥	0	0	0	ō	1999
13564	0	135640	0	0	0	0	0	Q	ò	0	2000
14530	0	145304	٥	0	0	0	0	0	0	0	2001
14008	0	140086	0	0	0	¢	0	0	0	o	2002
12744	0	127444	o	٥	0	0	o	0	0	0	2003
7364	0	73644	· 0	0	0	0	.0	0	0	Ó	2004
2359	Q	23593	0	0	0	0	0	0	. 0	. 0	2005
282	Ŷ	2825	0	0	0	0	0	, 0	0	0	2006
	٥	0	0	0	0	. 0	0	0	0	0	2007
	o	0	0	0	0	0	0	0	٥	0	2008
	0	0	0	0	0	0	0	0	0	.0	2009
	0	0	0	0	0	0	•	• •	0	0	2010
	0	0	0	0	0	0	0	0	· 0	́ ф	2011
	0	0	0	0	0	. 0	. 0	0	0	0	2012
		0	0	0	0	•	o	0	0	0	2013
104058	0	1040582	0	٥	0	0	0	0	0	0	TOTAL

TABLE 12.4.7 CAPITAL COST BY PLANT TYPE OF CENTER

Discounted

TOTA	PUMP	HYDR	сомв	LNGP	GEDT	DSEL.	COAL	OILE	GAST	NUCL	EAR
	 0	 0		 0	 0	0	 0	 0	 0		993
	Ø	0	0	٥	0	o	Ó	0	ō	ō	994
972	0	9729	٥	٥	Ó	ò		ò	ō	ò	995
3000	0	30007	0	0	0	0	0	0	0	. 0	996
7058	0	70580	0	Ò	0	ō	. 0	Ó	ō	, O	997
14853	. 0	137426	· 0	0	0	0	0	0	0	0	998
22566	´ 0	144305	0	0	0	. 0	. 0	0	٥	0	999
36149	0	135640	0	0	0	0	. 0	0	· 0	0	2000
62158	0	145304	0	0	0	0	0	0	0	0	2001
70245	٥	140086	. 0	٥	0	0	0	. 0	0	0	002
73406	0	127444	0	0	0	, O	0	.0	0	0	2003
66190	0	73644	0	0	0	. 0	· O	0	· •	. 0	2004
62585	0	23593	0	0	. 0	0	. 0	. 0	· 0	· 0	2005
40862	0	2825	0	0	0	0	0	. 0	0	0	2006
35395	٥	0	0	0	0	0	0	٥	•	0	2007
41321	0	0	٥	٥	¢	• . • • 0	0	0	o	• 0	8008
40109	٥	0	0	· 0	0	0	· . 0	0	0	0	2009
32476	0	0	0	0	. 0	0	0	0	0	0.	2010
20781	0	Ŷ	0	0	0	0	0	0	0		2011
5363	0	. O	. 0	0	0	0	0	0	0	• •	2012
r	0	0	0	0	0	٥	0.	0	0	0	2013 .
635497	0	2862193	376952	0	0	0	3095814	0	 0	0	TOTAL

TABLE 12.4.8 CAPITAL COST BY PLANT TYPE OF TOTAL SYSTEM

٩

											~	(W8)									-	(4 8)	
7EAR #	PLANT	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
2004 1	HBAN	0.0	0.0	0.0	0.0	0.0	5.4	10.6	32.8	56.2	37.5	!	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	151.9
2004 1	COUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	19.6	36.1	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.
2006 2	cauA	0.0	0.0	0.0	0'0	0.0	0.0	0,0	0 i	0	7.8		72.3	30.7	0 i	0.0	0 0 0 0	٥. ٥	00	0.0	0.0	0,0	150.0
		0.0	0.0	0.0	0.0	0.0	0 4 0 4	10.8	5.5 5 5	- • •	7 · · ·		1.001	4-14	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2					50			0.100
m ∾		•••	0.0	0.0		0.0		2.2		5	2			+		~		~	~				5
8		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.1	3.2	5.4. 5	9.7	6.0	5.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	32.6
2009 1	HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.1	3.2	5.4	5.7	. 6.0	5.4	1.3	0.0	0.0	0.0	0.0	0.0	32.
0	HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.1	3.2	5.4 4	9.7	6.0	4.v	ч. Ч. Ч	0.0	0.0	0.0	0.0	32.6
2010 1	COUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ь. Ю	19.6	36.1	15.3	0.0	0.0	0.0	0.0	75.
2011 2	HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.1	3.2	5.4	6.7	6.0	S.4	1.3	0.0	0.0	0.0	32.
			1		•	1				•	4	~		4	× #	, 9	0.46	2 7 7		н а			
2012 1	HDAI	0.0	0.0		•••	00		- - -								4.41	5.02	24.0		6.41		0.0	204.0
							٠						0.0	0.0	0	0.0	0.0	11.7		108.4	46.0	0.0	225
2013 1			0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	н. Н	9.5	16.3	10.9	0.10	0.0	44.0
1				***										1			Ì		1				
	TOTAL	0.0	0.0	0.0	0.0	0.0	£.3	21.4	55.6	131.7	178.2	252.7	253.6	254.7	108.1	66.1	122.3	164.0	157.0	141.8	49.0	0.0	1960.5
					••																		
•																							
			-																				
:	. •		•																				
г Ш	TABLE 13.1.1.2	CONSTR	CONSTRUCTION COSTS (FOREIGN)	COSTS	(FOREIG	9	NORTH							CONST	RUCTION	CONSTRUCTION COSTS (FOREJON)	(FORE IG)		CF NON 10				
											-	(M\$);										(M\$)	
YEAR #	* PLANT	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
				0.0	0.0	0.0	4.4	15.9	49.2	94.35	56.2	15.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0 0	0.0	227.8
		0.0		0.0	0	0.0	0.0	0.0	15.6	78.6	144.5	61.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0
	2 COUA	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.3	157.1	289.0	122.6	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	600.0
	I HSON	0.0	0.0	0.0	0.0	0'0		16.2	27.4	81.1	137.8	248.2	154.5	137.1	33.8	0.0	0.0	0	0.0	0.0	0.0	0.0 0	0 0 00
2007 3	3 CQUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.9	235.7	433.5	183.9	0.0	0.0	0	0.0	0.0	0.0	0.0	00 6
- acce	acon +	. 0	0.0	0.0	0.0	0-0		0.0	2,5	4.3	12.7	21.6	38.9	24.2	21.5	5. Y	0.0	0.0	0.0	0.0	0.0	0.0	131.0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	4.3	12.7	21.6	36.9	24.2	21.5	5.3	0.0	0*0	0.0	0.0	0.0	131
2010	NOSH 1	0.0	0.0	0.0	0.0	0,0	0.0	0.0	0.0	0.0	ي. ۲	4.1	12.7	21.6	38.9	24.2	21.5	S.3	0.0	0.0	0.0	0.0	131
2010	1 COUA	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	78.6	144.5	61.3	0.0	0.0	0.0	0.0	300
2011 1	NOSH I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0-0	2.5	4.J	12.7	21.6	38.9	24.2	21.5	ŝ	0.0	0.0	0.0	131
											. (4	((ч с.т		a 77		2.64		0.0	1 8.0
	1 HDAI	0.0	0.0	0.0	0.0	0.0	00	0.0	•••	0.0	•••	2 C 2 C			1 F 0 a	3 - 1 C		2.00 144.3	76.95	51.5	0.0	0.0	308.8
	1 HHOU	0	0	0.0	0.0	•••	+								0.0	0.0	0.0	46.94	235.7	433.5	183.9	0.0	0.009
2013 U	3 COUA	000	0.0	0.0	0.0	0.0	000	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	5.0	12.3	38.0	65.1	43.4	12.2	0-0	176.0
																					• • • •		
			•	•	•	•			4 70	0.02	199.4	570.4	756.7	100		207.6	113	124	429.4	210.0	1.961) 	000

(4) Case-SS/GS

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CONSTRUCTION COSTS (DOMESTIC) OF SOUTH

SOUTH	
P P	
(DOMESTIC) OF	
COSTS	
CONSTRUCTION COSTS 4	•
ABLE 13.1.2.1	•
÷	÷

# PLANT 1993 1994 1994 1994 1994 1994 2000 2001 2011			• •									Å,	(#W)										(M\$).	
0.0 0	LEAR.	# PLANT	1993	1994	1995	1996	19.97	1 ()		1	1	1	1	2004		2006	2007	2008	2009		2011	· · · i	2013	TOTAL
0.0 0	1000				0.0	0.0	0.0	0.0	1	25.1	i			0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.96
0.0 0	2005			0.0	0.0	0.0	0.0	0.0	1	2.5				0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	4.8.0
0.0 0	2002	HDAT	0.0	0	0.0	0.0	0.0	0.0		10.5				10.3		0.0	0.0	0.0		0.0	0.0	0.0	0-0	149.7
0.0 0	9005		0.0	0.0	0.0	0.0	0.0	0.0		0.0				15.3		0.0	0.0	0.0		0.0	0.0	0.0	0.0	75.0
0.0 0.0 0.0 0.0 7.8 39.3 72.3 30.7 0.0 <t< td=""><th>2006</th><td>1 HDON</td><td>0 0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0*0</td><td>0.0</td><td></td><td>2.8</td><td></td><td></td><td></td><td>24.7</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>100.0</td></t<>	2006	1 HDON	0 0	0.0	0.0	0.0	0*0	0.0		2.8				24.7		0 . 0	0.0	0.0		0.0	0.0	0.0	0.0	100.0
0.0 0			4	с с	¢ c	c	. 0 0	0.0		0.0				39.3		30.7	0.0	0.0		0.0	0 0	0.0	0.0	150.0
0.0 0	2002	A NEW+						0.0		0.0				7.8		72.3	30.7	0.0		0.0	0.0	0.0	0.0	150.0
0.0 0	BUQ2				, , , , , , , , , , , , , , , , , , ,					0.0				0.0		5.05	72.3	30.7		0.0	0.0	0.0	0.0	150.0
0.0 0.0 <th>4002</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.0</td> <td></td> <td></td> <td></td> <td>0.0</td> <td></td> <td>11.7</td> <td>58.9</td> <td>108.4</td> <td></td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>225.0</td>	4002									0.0				0.0		11.7	58.9	108.4		0.0	0.0	0.0	0.0	225.0
0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	2011		• •	0.0	0.0	0*0.	0.0	0.0		0.0				0.0		0.0	11.7	58.9		0.94	0.0	0.0	0.0	225.0
0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	6106	NCH.	6	0.0	0.0	.0.0	0.0	0.0		0.0				0.0		0.0	0.0	11.7		108.4	46.0	0.0	0.0	225.0
0.0 0.0 0.0 9.0 9.2 40.9 102.0 139.4 127.7 97.4 126.3 153.9 173.5 209.7 217.2 174.0 82.1 15.3 0.0	2013	+ MBN -	0	0.0	0.0	. 0.0	0.0	0.0		0.0				0.0		0.0	0.0	0.0		19.6	36.1	15.3	0.0	75.0
		TOTAL	0.0	0.0	0.0	0.0		0.0	9.2		102.0	139.4	į	97.4	126.3	153.9	173.5	09.7		174.0	82.1	15.3	0.0	1668.7
								-						1 t 1			1	1		 				

TABLE 13.1.2.2 CONSTRUCTION COSTS (FOREIGN) OF SOUTH

CONSTRUCTION COSTS (FOREIGN) OF SOUTH

			,															i					
											~	(##)										(M 8)	
YEAR	YEAR # PLANT 1993 1994 1995 1996 1997 1998	E991	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
2003	2 NEW	0.0	0.0	0.0	0.0	0.0	0.0		100.5	185.0	78.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
2004	1 NEW	0.0	0.0	0.0	0.0	0.0	0.0		10.0	50.3	92.5	39.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
2005	1 HCAI	0.0	0.0	0.0	0.0	0.0	0.0		15.7	48.4	83.1	55.4	15.5	0.0	0.0	0.0	0.0	0.0	0.0	0			2010
2005	1 NEW+	0.0	0.0	0.0	0.0	0.0	0.0		0.0	15.6	78.6	144.5	61.3	0.0	0.0	0.0	0.0	0.0	0.0				
2006	1 HDON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	10.5	32.4	55.5	37.0	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0
2007	2 NEW+	0.0	0.0	0.0	0-0	0.0	0.0		0.0	0.0	0.0	31.3	157.1	289.0	122.6	0.0	0.0	0.0	0.0	0	c	с с	0.007
2008	2 NEV+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31,3	157.1	289.0	122.6	0.0	0.0	0.0	0.0	0.0	0.0	
2009	2 NEW+	0.0	0.0	0-0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	31.3	157.1	289.0	122.6	0.0	0.0	0.0	0.0		0.004
2010	3 NEW+	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0	0.0	0.0	0.0	46.9	235.7	633.5	183.9	0.0	0,0			
2011	3 NEW+	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.92	235.7	433.5	183.9	0.0	0.0	0.0	900.0
2012	3 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				183.9	0-0	c c	000
2013	1 NEW+	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	.0*0	0.0	0.0	0.0	15.6	78.6	144.5	61.3	0.0	300.0
	TOTAL	0.0	0.0	0.0.	0.0	0.0	0.0	26.3	130.5	309,8	364.9	325.9	302.2	487.8	615.6 694.2	694.2	838.7	868.7	696.0	328.4	61.3	0.0	6050.4
					5411111		1111111			*****													

CONFTAUCTION COSTS (DOMESTIC) DF CENTER (11)	CONTRUCTION CONTRUCTION <	C) 0F CENTER (14) CONSTRUCTION COSTS (CONNESTES) OF CENTER (14) 1377 379 179 200 200 200 200 200 201 202 203 20																	. •				Case	Case-SS/GS	Ś
(145) (145) 137 1397 1397 1397 1397 200 2001 2002 2003 2004 2007 2010 2011 2012 <t< th=""><th>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</th><th>$\begin{array}{c ccccccccccccccccccccccccccccccccccc$</th><th>CONST</th><th>a.</th><th>JCTION</th><th>COSTS (</th><th>DOMESTI</th><th></th><th>ENTER</th><th></th><th></th><th></th><th></th><th>•</th><th></th><th>LSNOD</th><th>RUCTIO</th><th>N COSTS</th><th>CDOMEST</th><th>TIC) OF</th><th>CENTER</th><th></th><th></th><th></th><th></th></t<>	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	CONST	a.	JCTION	COSTS (DOMESTI		ENTER					•		LSNOD	RUCTIO	N COSTS	CDOMEST	TIC) OF	CENTER				
199 199 200 201 202 203 204 204 204 204 201 <th>197 199 199 200 201 203<th>197 198 199 200<th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th>(M\$)</th><th>1</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(M\$)</th><th></th></th></th>	197 199 199 200 201 203 <th>197 198 199 200<th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th>(M\$)</th><th>1</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(M\$)</th><th></th></th>	197 198 199 200 <th></th> <th>-</th> <th>(M\$)</th> <th>1</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>(M\$)</th> <th></th>											-	(M\$)	1									(M\$)	
Z1:6 37.0 Z4.7 6.9 0.0<	Z1:6 37.0 25.7 6.9 0.0 <th0.0< th=""> 0.0 0.0 <th< th=""><th>Tit Tit Tit</th></th<><th>1993</th><th>m</th><th>1994</th><th>1995</th><th>1996</th><th></th><th>1998</th><th>1999</th><th>2000</th><th>2001</th><th>2002</th><th>2003</th><th>2004</th><th>2005</th><th>2006</th><th>1.1</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>TOTAL</th></th0.0<>	Tit	1993	m	1994	1995	1996		1998	1999	2000	2001	2002	2003	2004	2005	2006	1.1	2008	2009	2010	2011	2012	2013	TOTAL
5.3 1.5.2 27.3 1.6.4 5.2 0.0	5.3 14.2 77.1 31.4 5.2 0.0 <t< td=""><td>3.3 31.4 7.10 11.4 5.2 0.00 <</td><td>6</td><td>0</td><td>0.0</td><td>2.8</td><td>. 0.7</td><td></td><td>37.0</td><td>24.7</td><td>6.9</td><td>0 0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0 0</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td>0-0</td><td>0.0</td><td>0.0</td><td>100.0</td></t<>	3.3 31.4 7.10 11.4 5.2 0.00 <	6	0	0.0	2.8	. 0.7		37.0	24.7	6.9	0 0	0.0	0.0	0.0	0.0	0 0		0.0	0.0	0.0	0-0	0.0	0.0	100.0
3.2 9.9 17.0 11.4 3.5 7.0 4.0 0.0 <td< td=""><td>3.2 9.4 17.0 11.4 3.2 0.0 <td< td=""><td>3.2 9.4 17.0 11.4 3.2 0.0 <td< td=""><td></td><td>0</td><td>0.0</td><td>0.0</td><td>5. L</td><td></td><td>16.2</td><td>27.8</td><td>18.6</td><td>5.2</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>75.2</td></td<></td></td<></td></td<>	3.2 9.4 17.0 11.4 3.2 0.0 <td< td=""><td>3.2 9.4 17.0 11.4 3.2 0.0 <td< td=""><td></td><td>0</td><td>0.0</td><td>0.0</td><td>5. L</td><td></td><td>16.2</td><td>27.8</td><td>18.6</td><td>5.2</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>75.2</td></td<></td></td<>	3.2 9.4 17.0 11.4 3.2 0.0 <td< td=""><td></td><td>0</td><td>0.0</td><td>0.0</td><td>5. L</td><td></td><td>16.2</td><td>27.8</td><td>18.6</td><td>5.2</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>75.2</td></td<>		0	0.0	0.0	5. L		16.2	27.8	18.6	5.2	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	75.2
UN 111 7: 2: 8 40.9 77.9 7.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	UN 311 712 212 613 713 716 010 010 010 010 010 010 010 010 010 0	0.0 311 7.7 2.8 6.0 0	0.0	00	0.0	0 0 0 0	1. 1. 4	N O	ь. с.	17.0	11.4	N 1	0.0	0.0	0.0	00	00		000	0.0	0.0	00	0.0	000	46.0
0.0 0.0 111 2.8 3.4 14.6 9.3 2.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0	0.0		0.0	0.0	0.0	0.0	1.1	1.1	59.8 59.8	6.04	27.3	4.6	0.0	0.0	0		•••	0	0.0	0.0	0,0	0.0	110.5
0.0 0.0 0.0 0.0 1.6 1.4 4.4 76.1 50.8 14.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0:0 0	0:0 0	0	0	0.0	0.0	0-0	0.0	0 0	1.1	2,8	8.6	14.8	9.9 9	2.3	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	40.0
0.0 0.0 <td>0.0 0.0 0.0 0.0 0.0 1.6 3.9 12.0 20.6 13.7 3.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0</td> <td>0.0 0</td> <td>0</td> <td></td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>8 9</td> <td>14.4</td> <td>4.44</td> <td>76.1</td> <td>50.8</td> <td>14 2</td> <td>0.0</td> <td></td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>205.7</td>	0.0 0.0 0.0 0.0 0.0 1.6 3.9 12.0 20.6 13.7 3.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0	0		0.0	0.0	0.0	0.0	0.0	0.0	8 9	14.4	4.44	76.1	50.8	14 2	0.0		0.0	0.0	0.0	0.0	0.0	0.0	205.7
30:1 69.2 83.2 84.1 94.3 107.3 110.4 74.1 27.9 3.8 0.0	30.1 63.2 63.2 64.1 94.3 107.3 110.4 74.1 27.9 3.8 0.0	30.1 64.2 94.3 107.3 110.4 74.1 27.9 3.8 0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	3.9	12.0	20.6	13.7	3.8		0.0	0.0	0.0	0.0	0.0	0.0	55.6
OF GENTER 97 1978 1999 2000 2001 2002 2003 2004 2005 2007 2008 2009 2010 2011 2013 2.4 5.5 37.0 10.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Inucltion costs (Foreten) of center Construction costs (Foreten) of center Construction costs (Foreten) of center Construction costs (Foreten) of center 1994 1995 1997 1999 1997 2000 2005 2007 2013 2013 2013 1994 1997 1997 1999 1997 2000 2001 2005 2001 2013 2014 2013 2014 2014 2014 2014 2013 2014 2013 2014 2013 2014 2013 2013 2014 2013 2014 2013 2014	OF CENTER (M4) 977 1992 1999 2000 2001 2005 2004 2007 2010 2011 2012 2013 174 1992 1999 2000 2001 2005 2004 2007 2010 2011 2012 2013 174 174 2755 177 7.28 35.25 177 27.1 2010 0.0<	0.0	0	0.0	2.8	10.4		~	83.2	84.1	1	107.3	110.4	74.1	27.9	3.8	0.0	0.0	0 0	0.0	0.0	0.0	0.0	201.8
(M5) 1995 1994 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2099 2010 2011 2012 2013 (M5) (45) 1,2 10.5 32.4 515 37.0 10.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(M\$) 1994 1995 1994 1997 1998 1999 2000 2001 2002 2003 2004 2005 2004 2004 2010 2011 2012 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2014 2014 2013 2013 2014 2014 2013 2013 2014 2013 2014 2013 2013 2014 2013 2014 2013 2014 2013 2014 2013	(M4) 1994 1995 1994 1997 1998 1997 1998 1997 2000 2001 2002 2003 2004 2005 2004 2004 2010 2011 2012 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2014 2014 2013 2013 2014 2013 2013 2014 2013 2013 2013 2014 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2013 2014 2013 2014 2014 2013 2014	NO	s'TRUC	TION CC)STS (F(DREIGN >		TER							CONSTR	UCTION	COSTS (FOREIGN	1) DF 0	ENTER				
1995 1994 1997 1998 1999 2000 2001 2003 2004 2005 2007 208 2099 2011 2012 2013	1994 1995 1994 1997 1998 1997 1998 1997 1998 1997 2000 2001 2005 2006 2007 2008 2019 2011 2012 2013 2013 0.0 1.2 10.5 32.4 55.5 37.0 10.4 0.0	1994 1995 1994 1997 1998 1997 1998 1997 1998 1997 2000 2001 2005 2006 2007 2008 2010 2011 2012 2013 2013 0.0 <td< th=""><th>÷ .</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Σ</th><th>÷.</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(SM</th><th></th></td<>	÷ .										Σ	÷.										(S M	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1993	5. 5.] 1		- -					2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
0.0 7.2 7.4 41.6 77.9 7.8 0.0 <td< td=""><td>0:0 0</td><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>13</td><td></td><td></td><td> </td><td>!</td><td></td><td></td><td></td><td></td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>150.0</td></td<>	0:0 0	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	13				!						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0
0.0 1.7 4.8 1.7 4.8 0.0 0	0.0 1.9 4.8 14.9 25.5 17.0 4.8 0.0 <t< td=""><td>0.0 1.9 4.8 14.9 25.5 17.0 4.8 0.0 <t< td=""><td>3</td><td></td><td></td><td></td><td>÷</td><td></td><td></td><td></td><td></td><td></td><td>0-0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0*0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>112.9</td></t<></td></t<>	0.0 1.9 4.8 14.9 25.5 17.0 4.8 0.0 <t< td=""><td>3</td><td></td><td></td><td></td><td>÷</td><td></td><td></td><td></td><td></td><td></td><td>0-0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0*0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>112.9</td></t<>	3				÷						0-0	0.0	0.0	0.0	0.0	0*0	0.0	0.0	0.0	0.0	0.0	0.0	112.9
0.0 0			0.0											0 , 0 ,		0.0	0.0	0 0 0 0	0.0	0.0	00		00	0 0	2 C C C C C C C C C C C C C C C C C C C
0.0 0	0.0 0	0.0 0	0.0						~ ~					11.4	0.0	000	0.0	0.0	•••	•••	0.0	0.0	0.0	0.0	165.6
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 21.6 66.5 114.1 76.1 21.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 8.7 21.6 66.5 114.1 74.1 21.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 8.7 21.6 66.5 114.1 74.1 21.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0											14.8	4 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4 5.8 18.0 30.9 20.6 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.2 15.6 45.1 124.8 124.8 126.1 148.9 160.9 165.4 1111 41.9 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4 5.8 18.0 30.9 20.6 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4 5.8 18.0 30.9 20.6 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0											14.1	76.1	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	308.2
4.2 15.6 45.1 102.3 124.8 126.1 148.9 160.9 165.4 111.1 41.9 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 4.2 15.6 45.1 102.3 124.8 126.1 148.9 160.9 165.4 111.1 41.9 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 4.2 15.6 45.1 102.3 124.8 126.1 149.9 160.9 165.4 111.1 41.9 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0		•								. !	18.0	30.9	20.6	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.4
			0.0												1.11.	41.9	α. α	0.0	0.0	0.0	0.0	0.0	0.0		052.2

Case-SS/GS

TABLE 13,3.1.1 CONSTRUCTION & IDC (DOMESTIC) OF NORTH

												(#\$)	
YEAR	N PLANT	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
2004	1 H8AN	0.0	0.0	0.0	0.0	0.0	7.5	16.4	46.0	71.8	43.5	11.2	0.0
2004	1 COUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	24.9	42.1	16.4	0.0
2006	2 COUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8	49.9	84.3
2007	1 HSON	0.0	0.0	0.0	0.0	0.0	0.0	22.9	33.3	93.3	142.5	232.5	133.2
2007	3 CQUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	74.8
2008	1 HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.9	5,5	8.3	13.6
2009	1 HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.9	5.5	8.3
2010	1 HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0,0	0.0	1.3	1.9	5.5
2010	1 CQUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0,0
2011	1 HSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.9
2012	1 HOAI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	1 KHOU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	3 CQUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	1 HHOU	0.0	0 0	0.0	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	0.0	0.0	0.0	0.0	0.0	7.5	39.2	86.0	193.3	247.7	343.3	321.6

TABLE 13.3.1.1 CONSTRUCTION & IDC (DOMESTIC) OF NORTH

											(M\$)	
		PLANT		2006		2008	2009			2012		
2004		HBAN	0.0	0.0	0.0	0.0	0.0					196.4
2004	1	CQUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.9
2006	z	COUA	32.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	177.8
2007	1	RSON	106.6	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	788.0
2007	3	CQUA	126.4	49.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	266.7
2008	1	HSON	7.8	6.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	46.1
2009	1	HSON	13.6	7.8	6.2	1.4	0.0	0.0	0.0	0.0	0.0	46.1
2010	1	HSON	8.3	13.6	7.8	6.2	1.4	0.0	0.0	0.0	0.0	46.1
2010	1	CQUA	0.0	5.4	24.9	42.1	16.4	0.0	0.0	0.0	0,0	88.9
2011	1	HSON	5.5	8.3	13.6	7.8	6.2	1,4	0.0	0.0	0.0	46.1
2012	1	HDAI	0.0	5.9	13.0	36.4	56.8	34.5	8.9	0.0	0.0	155.5
2012	ì	HHOU	0.0	10.2	22.2	62.4	97.4	59.1	15.2	0.0	0.0	266.4
2013	3	ÇQUA	0.0	0.0	0.0	0.0	16.3	74.8	126.4	49.2	0.0	266.7
				0.0			13.3		12.6			
				130.5								
		• • • • •		·			*****			~~~		

Case-SS/GS

													(M\$-)	
rear	#	PLANT	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
2004		HBAN	0.0	0.0	0.0	0.0	0.0	11.3						
2004	1	CQUA	0.0	0.0	0.0	0.0	0.0	0.0	24.5		107.7	65.3	16.8	0.0
006	2	CQUA	0.0	0.0	0.0	0.0	0.0	-	0.0	21.7	99.8	168.6	65.6	0.0
007	1	HSON	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	43.4	199.5	337.1
007	3	COUA	0.0	0.0	0.0	0.0	0.0	0.0	34,3	49.9	139,9	213.6	348.6	199.6
					•••	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	299.3
800	1	HSON	0.0	0.0	0.0	0.0								
009	1	RSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,4	7.8	21.9	33.5	54.6
010	1	HSON	0.0	0.0	0.0		0.0	0.0	0.0	0.0	5.4	7.8	21.9	33.5
010	1	COUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	7.8	21.9
011	1	HSON	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	7.8
012	1	HDAI	0.0	0:0	0.0	6 B	·		· · ·				•••	
012		нной	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013		CQUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0,0	0.0	0.0	0.0	0.0
013		янои	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	T	TOTAL	0.0	0.0										••
					0.0	0.0	0.0	11.3	58.8	146.0	360.5	525.9	764.1	953.9

TABLE 13.3.1.2 CONSTRUCTION & IDC (FOREIGN) OF NORTH

TABLE 13.3.1.2 CONSTRUCTION & IDC (FOREIGN) OF NORTH

											(M\$)	
TEAR	#	PLANT	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
2004	1	HBAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	294.6
2004	1	COUA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	355.6
2006	2	CQUA	131.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	711.2
2007	1	HSON	159.8	35.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1181.4
2007	3	COUA	505.7	196.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1066.7
8008	1	HSON	31,3	25.0	5.6	0.0	0.0	0.0	0.0	0,0	. 0.0	185.1
2009	1	HSON	54,6	31.3	25.0	5.6	.0.0	0.0	0.0	0.0	0.0	185.1
2010		HSON	33.5	54.6	31.3	25.0	5.6	0.0	0.0	0.0	0.0	185.1
2010		CQUA	0.0	21.7	99.8	168.6	65.6	0.0	0.0	0.0	0.0	355.6
2011	1	RSON	21.9	33,5	54.6	31.3	25.0	5.6	0.0	0.0	0.0	185.1
2012		HDAI	0.0		·	1.1					1.12	
2012				8.9	19.4	54.7	85.3	51,7	13.3	0.0	0.0	233.4
		ннол	0.0	15.3	33.3	93.6	146.0	88.5	22.7	0.0	0.0	399.3
2013		CQUA	0.0	0.0	0.0	0.0	65.0	299.3	\$05.7	196.7	0.0	1066.7
2013	1	нноо	0.0	0.0	8.7	19.0	53.3		50.5	13.0	0.0	227.6
		TOTAL	938.0	422.7	277.7	397.7	445.9		592.2		0.0	6632.7

TABLE 13.3.2.1 CONSTRUCTION & IDC (DOMESTIC) OF SOUTH

												(#\$)	
 (EAR	# PLANT	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	2 NEW	0.0	0.0	0.0	0.0	0.0	0.0	6.9	31.9	53.9	21.0	0.0	0.0
2003	2 NEW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	16.0	27.0	10.5	0.0
004		0.0	0.0	0.0	0.0	0.0	0.0	7.4	16.1	45.4	70,8	42.9	11.0
2005	1 HDAT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	24.9	42.1	16.4
2005	1 NEW+ 1 HOON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	10.8	30.3	47.3	28.7
2007	2 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8	49.9
2008	2 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8
2009	2 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	3 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0,0	0.0	0.0	0.0	0.0	0.0
2011	3 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	3 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	1 NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	14.3	56.5	131.5	174.0	153.7	116.0

TABLE 13.3.2.1 CONSTRUCTION & IDC (DOMESTIC) OF SOUTH

Circle 1

											(M\$)	
rear	#	PLANT	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
		 NEW	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	113.8
2003	_	NEW	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.9
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	193.6
005		HOAT NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.9
005 006	-	HDON	7.4		. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	129.3
007	2	NEW+	84.3	32.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	177.8
008		NEW+	49.9	84.3	32.8	0.0	0,0	0.0	0.0	0.0	0.0	177.6
000	_	NEW+	10.8	49.9	84.3	32.8	0.0	0.0	0.0	0.0	0.0	177.8
2010	_	NEW+	0.0	16.3	74.8	126.4	49.2	0.0	0.0	0.0	0.0	266.7
2011		NEW+	0.0	0.0	16.3	74.8	126,4	49.2	0.0	0.0	0.0	266.7
2012	,	NEW+	0.0	0,0	0.0	16.3	74.8	126.4	49.2	0.0	0.0	266.7
2012	5	NEW+	0.0	0.0	0.0			24.9	42.1	16.4	0.0	88.9
		TOTAL	152.4	183.2	208,1	250.3	255.8	200.5	91.3	16.4	0.0	2004.6

TABLE 13.3.2.2 CONSTRUCTION & IDC (FOREIGN) OF SOUTH

													(M\$)	
YEAR	 #	PLANT	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		NEW	0.0	0.0	0.0	0.0	0.0	0.0	27,8	127.7	215.8	83.9	0.0	0.0
2003	_	NEW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	63.8	107.9	42.0	0.0
2004		HDAI	0.0	0.0	0.0	0.0	0.0	0.0	11.1	24.2	68.0	106.1	64.3	16.5
2005		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0,0	0.0	21.7	99.8	168.6	65.6
2005 2006		HOON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	16.2	45.5	70.9	43.0
2007	,	NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.4	199.5
2008		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2009		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	2	NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.0	 0.0	0.0	0.0	0.0	0.0	38.8	173.1	385.4	443.1	389.1	368.0

TABLE 13.3.2.2 CONSTRUCTION & IDC (FOREIGN) OF SOUTH

					-						(M\$}	
YEAR	#	PLANT	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
2003		NEW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	455.1
2004		NEW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	227,6
2005		HOAI		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	290.2
2005		NEW+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	355.6
2005		KDON	11.0	.0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	194.0
2007		NEW+	337.1	131.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	711.2
2007		NEW+	199.5		131.1	0.0	0.0	0.0	0.0		0.0	711.4
2000		NEWA	43.4	199.5	337.1	131.1	0.0	0.0	0.0	0.0	0.0	- 711.4
2007	_	NEW+	0.0	65.0	299.3	505.7	196.7	0.0	0.0	0.0	0.0	1066.
2010		NEW+	0.0		65.0	299.3	505.7	196.7	0.0	0.0	0.0	1066.
2012	-	NEW+	0.0	0.0	0.0	65.0	299.3	505.7	196.7	0.0	0.0	1066.
	-	NEW+	0.0	0.0	0.0			99.8	168.6	65.6	0.0	355.0
	• • •	TOTAL	591.1	732.B	832.6	1001.2	1023.4	B02.2	365.3	65.6	0.0	7211.

TABLE 13.3.3.1 CONSTRUCTION & IDC (DOMESTIC) OF CENTER

Case-SS/GS

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											(M\$)		
YEAR	# PLAN	T 1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
2001	1 HPLI	0.0	0.0	4.9	10.8	30.3	47.3	28.7	7.4	0.0	0.0	0.0	0.0
2002	1 HSE	0.0	0.0	0.0	3.7	8.1	22.8	35.6	21.6	5.5	0.0	0.0	0.0
2002	1 HBVO	0.0	0.0	0.0	2.3	5.0	13.9	21.7	13.2	3.4	0.0	0.0	0.0
2004	1 HAN	0.0	0.0	0.0	0.0	0.0	3.4	7.4	20.8	32.5	19.7	5.1	0.0
2004	і нтни	0.0	0.0	0.0	0.0	0.0	5.5	11.9	33.5	52.2	31.7	8.1	0.0
2005	1 HSON	0.0	0.0	0.0	0.0	0.0	0.0	2.0	4.3	12,1	18.9	11.5	2.9
2006	1 HSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	22.2	62.3	97.2	59.0
2007	1 HRAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	6.0	16.8	26.3
	TOTAL	0.0	0.0	4.9	16.8	43.3	92.9	107.3	110.9	130.7	138.6	138.8	88.2

TABLE 13.3.3.1 CONSTRUCTION & IDC (DOMESTIC) OF CENTER

			•			:	· .				CM\$D .	
YEAR	*	PLANT	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
2001	1	HPLI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	129.3
2002	1	HSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.3
2005	1	ивор	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.5
2004	1	HAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.0
2004	1	HTHU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	142.9
2005	1	HISON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.8
2006	1	HSE	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	266.0
2007	1	HRAO	15.9	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.9
		TOTAL	31.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	907.5

TABLE 13.3.3.2 CONSTRUCTION & IDC (FOREIGN) OF CENTER

ANT 199											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
4.I 0.	0.0	7.4	16.2	45.5	70,9	43.0	11.0	0.0	0.0	0.0	0.0
E 0.	0.0	0.0	5.6	12.2	34.2	53.4	32.4	.8.3	0.0	0.0	0.0
ο. ο.	0.0	0.0	3.4	7.4	20.9	32.6	19.8	5.1	0.0	0.0	0.0
N 0.	0.0	0.0	0.0	0.0	5.1	11.1	31.3	48.8	29.6	7.6	0.0
(HV 0,	0.0	0.0	0.0	0.0	8.2	17.8	50.2	78.3	47.5	12.2	0.0
SON O.	0 0.0	0.0	0.0	0.0	0.0	3.0	6.5	18.2	28.4	17.2	4.4
6E 0.	0.0	0.0	0.0	0.0	0.0	0.0	15.2	33.2	93.4	145.7	88,3
RAO 0.	0 0.0	0.0	0,0	0.0	0.0	0.0	0.0	4.1	9.0	25,3	39.4
TAL 0.	0 0.0	7.4	25.1	65.0	139.3	160.9	166.3	196.0	207.8	207.9	132.2
RA	0. 0 0.	0.0 0.0 0 0.0 0.0	0.0 0.0 0.0 0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0 0.0 0.0 0.0 0.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 0.0 0.0 0.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 0.0 0.0 0.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 15.2 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 15.2 33.2 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.1	0.0 0.0 0.0 0.0 0.0 0.0 0.0 15.2 33.2 93.4 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.1 9.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 15.2 33.2 93.4 145.7 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.1 9.0 25.3

TABLE 13.3.3.2 CONSTRUCTION & IDC (FOREIGN) OF CENTER

-										(M\$)	
YEAR	# PLANT	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
2001	1 HPLI	0,0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	194.0
2002	1 HSE	.0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	145.9
2002	1 H8UO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.1
2004	1 HAN	0.0	0.0	0.0	.0.0	0.0	0.0	0.0	0.0	0.0	133.5
2004	з нтнџ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	214.2
2005	1 KSON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0,0	. 0.0	77.6
2006	1 HSE	22.7	. 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	398.5
2007	1 HRAO	23.9	6.1	0.0	0.0	0.0	0.0	0.0	0,0	0.0	107.8
	TOTAL	46.6	6.1	0.0	0+0	0.0	0.0	0.0	0,0	0.0	1360.6

The Methodology of ESPRIT

Methodology of ESPRIT, the least cost planning of long-term power system expans -ion with interconnected grids.

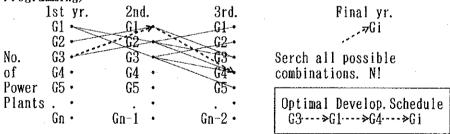
ESPRIT consists mainly from the two sub-programs, the master program and the lower program. The simulation logic is ilustlated below.

 Solve power exchanges from grid to grid by LP method.
 Master program
 Master program
 Pline
 Uine Flow
 Solve PDP of each independent grid by dynamic programming
 Grid-A
 Grid-B
 Grid-C
 Lower program (Isolated system)

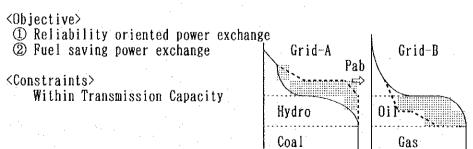
<Calculation Procedure>

(Step-1) Solve the least cost power development scenarios of each grid under the condition of fixed power exchanges (IT=0, Pline(N=0)) by dynamic programming method(DP).

(Dyamic Programming)



(Step-2) Transfer each PDP scinario to the Upper program and find economical and security enhenced power interchanges. (Pline(N=1))



Return to Step-1 and continue the same process.

С К. Quang)2 **В** К. Quang34 SL12
 SL34
 SL36
 SL36
 SL910 **JUL18** \$1.12
 \$1.34
 \$1.56
 \$1.56
 \$1.56
 \$1.56
 \$1.578
 \$1.910 Total Price SL(S)+HQ Total Price SL(L) Disconted/ Not discount Discounted/Not discount ୍ଚି ୧୯୦୦ ଅଧାର 1000 3000 000 1000 4000 3000 2000 SSAM SL12
 SL34
 SL34
 SL36
 SL36
 SL36
 SL36
 SL311 🗂 H. Quang]2 H. Quang34 21.12 51.34 51.36 51.36 51.37 51.37 51.37 51.910 5102 5102 . 1987 1998 1999 2000 2001 2002 2003 2004 2005 2005 2007 2008 2009 2010 2011 2012 2013 Year Y 2010 2011 2004 2005 2009 2019 201 Ø SL(S)+H. Cash flow SL(L) 1 2003 2004 2005 2006 2006 Year | **『**劉 |} Cash flow P 1002 6661 8661 1997 Ĵ 8 400 200 800 800 600 <u>10</u> 300 SSAN SSOR 699.3 Difference #SL1. 2 #3. 4 #3. 6 #5. 6 #7. 8 #9. 10 #. 0#1. 2 #3. 4 SL#1. 2 #3.4 #5.6 #7,8 #11.12 \$1.(L) 2783.6 Total
 Total(NUSS)
 Total(NUSS)

 Discounted
 Not Discounted

 538.1
 1393.8
 #SL

 57.4
 1393.8
 #SL

 57.4
 163.7
 #5

 47.5
 163.7
 #5

 118
 515
 H.4

 946
 220
 #3
 Total(NUSS) Discoounted Not discounted 85.2 232.6 = ±3 77.4 222.6 = ±5 70.4 222.6 = ±5 70.4 222.6 = ±5 84.0 222.6 = ±9 58.2 3482.9 SL 450.2 902.4

ð

Disbursment Schedule SL(L) and SL(S)+H. Quang

20 2013

19 2012

18 2011

17 2010

16 2009

15 2008

14 2007 6. J

6.5 19.1

84.8 34.8

 $^{13}_{281}$

12 2005 203 2 203 2 24, 2 44, 2 28 25, 2 25, 2

10 2003 470.4 48.1 48.1 4.9

2002 5127 25.28 3.3 3.3 3.3

2000-3 2690-3 399-5 399-3 399-

1999 90.5 3.8 9

51.8 3.3 3.3

1997 24. 7

Created on 2nd June 199;File:disburse Case:SL(L) Yr. 0 NPV(MUSS) 1993

8112 8128 81318 81310 813112

200

2013 2013

> 19 2012

> 38 2011

 $^{17}_{2010}$

16 2009

15 2008

14 2007

1. 1690821

1. 2859903 3. 7788332

1. 4145894 4. 1567165 7. 5734939

1. 5560483 4. 5723881 8. 3308433 10. 581129

1. 7116532 5. 029627 9. 1639276 111. 639241 12. 666233

19. 899943 5. 5325897 10. 08032 12. 803166 12. 803166 13. 932857 8. 1106026

64. 745782 11. 088352 14. 083482 15. 326142 8. 9216629 8. 0294966

129.99819 15.49163 16.858757 9.8138292 8.8324463 2.9791981

181. 35956 18. 544632 10. 795212 9. 7156909 3. 277118 1. 8891621

217. 43485 11. 874733 10. 68726 3. 6048298 2. 0780783 1. 3995221

139.0192 11.755986 3.9653127 2.2858862 1.5394744

138.03953 4.361844 2.5144748 1.6934218

51.084891 2.7659223 1.862764

Total Price at 1993 163725 51 997.4464 23.700567 22.163725 51 85.176584 23.700567 22.0490404 2 77.453258 2.0490404 1 70.393371 70.393371 53.176753 53.176753 1552.6211

	- 1	2

~	201	

6. 6

6.6 26.9

30,26,6 30,26,6

13 26.9 26.3 26.3 26.3 26.3 26.3 27 27 27

12 2005 30.2 30.2 48.6 15.9 15.9

11 257.6 48.6 48.6 15.9 5.4

10 2003 213.8 15.9 5.4 5.4 5.4 3.1

9 2002 15.9 5.4 3.1

8 2001 5.4 3.1

7 2000 45.7 3.1

6 63 72

5 1998

4

1993

Yr. Npv(kuss)

Case:SL(S)+

SL12 SL26 SL26 SL26 SL26 SL212

Total(NUSS) SL(L)

11.1

26 44.5

104.2 70.5

164.9 43.7

102.3 35.4

82.8 9.3

22.7 5

11.8

3.7598436 6.5753814 21.803828 24.489807 35.887044 20.615414 4.6763285 1.4485219 2.5543132 8.4744785 9.5108922 13.948049 8.0037162 1.8149387

. 1. 3057748 0

1. 4363523 5. 8542238 0

1. 5799875 6. 4396461 7. 2296399 0

7379863 0836107 9526039 2.797899

16.308105 7.7919718 8.7478643 14.077689 7.8209383

72. 807142 9. 6226507 15. 485458 8. 6030321 5. 06623 5. 06623

90. 287229 17. 034004 9. 4633353 5. 572853 1. 8926671

159.53781 10.409669 6.1301383 2.0819338 1.1951842 1.1951842 0

97.415223 6.7431521 2.2901271 1.3147026

23.451326 1.5907902 0.0

00

Total. SL(S) Price at 1993 538, 11943 57, 449363 52, 226694 47, 478813 43, 162557 Total difference : & (L)-(& (S)+# (D))=#111 ion USE450 at 1983

117.80765 45.754211 163.56186 901.99872

E. Quang12 H. Quang34 Total(NUSS) H. Quang Gr. Total SL(S)+B. Quar

738. 43686

Total (MUSS) SL(S)

R. Quang12 H. Quang34

() Case-SL/GL	z)			පු	() Case-SS/GL		ප
e-SL/GL	North fuel(MUS\$) O&N(Y) O&N(F) Total	T.P.Replace	South fuel (MUS\$) OAM(V) OAM(F) Total T.P. Replace	Central fuel(MUS\$) OMM(Y) OMM(F) Total Gr.Total	se-SS/(HL North fuel(MUS\$) 04M(F) 04M(F) Total T.P.Replace	South fuel(MUS\$) 04M(Y) 04M(F) Total T.P.Replace	Central fuel (MUS\$) OMM (Y) OMM (F) Total Gr.Total
23th June) 244.7 244.7 82.8 61.1 388.6	ce 60.5) 1941.5 520.5 118.9 2580.9 190.3	ري	23th June 1993.0 111.0 138.6 57.4 616.9 ce 74.1) 1941.3 520.4 118.9 2580.6 ce 191.4) 21.6 1.8 4.1 27.5 3490.5
not discoun	2013 117-2 35.6 41.6		930.0 249.3 80.9	15.7 1.3 2.8	not discoun 2013 196.9 66.4 45.8	929, 9 249, 3 80, 9	10.3 0.9 2.8
discounted	2014 5.5 5.5		129.4 34.7 10.9	2.2 0.2 4	discounted 214 27.4 9.2 6.2	129.4 34.7 10.9	4.
9,000	5.2 5.2 5.1	•	121.2 32.5 9.9	3 5 0 0 0 5 5	2015 25.7 8.7 5.6	121.2 32.5 9.9	1.3 0.3 0.3
	4.8 4.8 4.8		113.5 30.4 9.0	0.28	2016 24.0 8.1 5.1	113.5 30.4 9.0	1.3 0.1 0.3
	4°.5	•	106.3 28.5 8.2	1.8 0.1 0.3	2017 22.5 7.6 4.7	106.3 28.5 8.2	1.2 0.1 0.3
	12.5 3.8 2.8 8		89.5 26.7 7.5	1.7 0.1 0.3	2018 21.1 7.1 4.2	88.5 7.5 7.5	1.1 0.1 0.3
-2060)	.11.7 3.5 3.5		33. 2 25. 0 6. 8	1.6 0.1 0.2	2019 6.7 3.8	33. 25.0 6.8	0.10
0606	3.2.7		87.2 23.4 6.2	1.5 0.1 0.2	2020 18.5 3.5 3.5	23.2 53.4 6.2	1.0 0.1 0.2
2021	2.9.5		81.7 21.9 5.6	1.4 0.1 0.2	2021 17.3 3.2	81.7 21.9 5.6	0.100.1
2002	0.00		76.5 20.5 5.1 Ph	1.3 0.1 0.2	2022 5.5 2.9	76.5 20.5 5.1 Ph	0.9
2023	2.10		71.6 19.2 4.6 7nuNy#3 P 240 13.754053	1.2 0.1 0.2	2023 15.2 2.6 2.6	71.6 19.2 4.6 7huMy#3,4 P 480 27.508106	0.28
2024	5002 5502		67.1 18.0 4.2 7 7 240 12.503684	1.1 0.1 0.1	2024 14. 2 4. 8 2. 4	67.1 18.0 4.2 PhuMy≢5 G 12.503684	0.1
	2.1		62.8 16.8 3.8 3.6C#1,2 720 34.100957	1.1 0.1 0.1	2025 13.3 4.5 2.2	62.8 16.8 3.8 3.8 C/C#1,2 22.733972	00.1
5	-						

	XF.					
	2043 2.43 0.8 4	19.2 5.2 0.7 0.7 Phu ky #3 2.0444523	000	2043 4. 1 1. 4 0. 4	19.2 5.2 0.7 Pbully#3,4 480 4.0889046	0.0
	2042 2.6 0.9 0.4	20.5 5.5 0.8 0 2 1 7	000	2042 4.3 1.5 0.4	₩ 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	0.0
	2041 2.8 0.9 0.4	2 0 8 0 8 8 0 8 8 0	400	2041 4.6 0.5 0.5	21.9 5.9 0.8	0.00
	2040 3.0 1.0 0.5	23.4 0.3 0.3 0.3 0.3 0.3 0.3 0.0 0.0 0.0 0.0	400	2040 5.0 1.7 0.5	23.4 0.33.4	0.0
	2039 3.2 0.5	23.0 6.7 1.0	000 400	2039 5.3 0.6	25.0 6.7 1.0	000
	2038 3.4 1.1 0.6 0.6 1125 15.434114	26.7 7.2 1.1 0.01#10-12 1125 15.434114	0.0	2038 5.7 1.9 0.6 0.6 0.Ninh#8 375 5.1447045	26.7 7.2 1.1 1.1 Coal#10-12 1125 15.434114	000
	2037 9.56 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.1.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0	28.5 7.6 1.2 Coal#6-9 22.6367	000	2037 6.0 2.0 0.7 0.7 0.7 5.659175 5	28.5 7.6 1.2 1.2 Coal#6-9 Co 1500 22.6367	000
	2036 3.8 1.3 0.7	30.5 8.2 1.3 0al#3-5 1125 18.675277	000	0 20 0 2 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0	30.5 8.2 1.3 Coal#3,4,5 C 1125 18.675277	0.00
	2035 4.1 1.4 0.8	32.5 8.7 1.5 Coal#1,2 C 13.695203	0.0 0.1 0.1	2035 6.9 0.8	32.5 8.7 8.7 1.5 Coal#1,2 750 13.695203	0.4
	2034 4.4 1.5 0.8	34.7 9.3 1.6 C	0.0 0.0 1.0	2034 7.4 2.5 2.5 2.5 2.5 0.9 Q.Ninh#6 7.5323619	34 9 .0 .0	401 400
	4.7 4.7 0.9	37.1 9.9 0	0000	2033 7.9 1.0 1.0	37.1 9.9 1.8	0.0
	2032 5.0 1.7 1.7 1.0 1.0 .1141579	38 10.6 2.0 2	0011	2032 8.4 2.8 1.1 1.1 750 8.228316	39.6 10.6 2.0	0.4
· · · · · · · · · · · · · · · · · · ·	2031 20 5.3 5 5.3 5 1.8 1 1.1 0.Ninh#2,3 Q.Ninh#4 750 051147 9,11415	42.3 11.3 2.2 0	0.1	2031 2032 9.0 8.4 3.0 2.8 1.2 1.2 4.Ninh#2.3 Q.Ninh#4.5 20.051147 18.228316	112.33 2.2 2.2	0.5 0.1 0.1
	2030 5.7 1.8 1.2	45.2 12.1 2.4	0.00 0.18	7 6 73.940 1.3.740 1.3.760 1.3.770 1.3.770 1.3.770 1.3.770 1.3.770 1.3.770 1.3.770 1.3.770 1.3.77000 1.3.77000 1.3.770000000000000000000000000000000000	45.2 12.1 2.4 6C/C#7 7.0580038	0.000
	2029 6.1 2.1 1.3 1.3 4.Ninh#1 375 12.130944	8 48.3 8 12.9 9 CC/C#6,7 7 15.527608	871 000	2029 10.2 3.4 1.5 4.Ninh#1 375 12.130944	48.3 12.9 2.6 3.6 GC/C#5,6 15.527608 7	0.5 0.1 0.1
	1-1-202	51.(13.3 2.5 C#5 5401841	Case (0.1	2028 10.28 1.67 1.67	51.6 13.8 13.8 2.9 GC/C#4 240 8.5401847	0.0
Case	2027 6.9 1.6 1.6	S5.1 14.8 3.2 6C/C#3,4 18.788406 8.1	0 0 0 0	2027 11.7 3.9 1.8	₩ 3778 23. 23. 23. 23. 23. 23. 23. 23. 23. 23.	0.6
	2026 7.4 1.8 1.8	58.8 15.8 3.5 9 1		2026 12.4 2.0 2.0	58.8 15.8 3.5 GC/C#3 10.333623	0.7 0.1 0.1

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	2060 V 0.8 0.3 0.1	6.3 1.7 0.1 Coal#1,2 1.2640125	000	2060 1.3 0.1	6.3 1.7 0.1 0.1 0.1 0.1 0.1 1.2640125	0.0
	2059 0.8 0.1 0.1	0 784 0 784	0.0	2059 1.4 0.5 0.1 2.0 0.1 2.6952069	0 73 0 78 4 0 7 8 4	0.0
	2058 0.9 0.1	7.2 0.2 0	0.0	2058 1.5 0.5 0.1 0.1	7.2 1.9 0.2	0.1
	2057 1.0 0.3 0.1 0.1 Q.Nimh#4 375 0.8412003	7.7 2.1 0.2	0.1 0.0	2057 1.6 0.5 0.1 0.1 Niuh#4,5 750	2.1 0.2 0	0.0
	2056 1.0 0.3 0.1 0.1 0.1 7.0 1.8506407 0	0 538	0.0	2056 1.7 0.6 0.1 0.1 1.0 750 .8506407 1	0 555 0758 0758	0.0
	2055 1.1 0.4 0.1 0.1	0 53.7	0.0	2055 1.88 0.16 0.1 0.1	0 0 0 0 0	0.0
:	2054 1.2 0.4 0.1 375 .1196376	0 523 0723	0.000	2054 2.0 0.7 0.1 0.1 0.1 0.1 1.1196376	0 523 058	0.00
	2053 1.3 0.4 0.1 0.1	0 22.7 0.3	000	2053 2.1 0.2 0.2 1.1	2.7 0.3 0.3	0-0
	2052 1.3 0.5 0.2	10.6 2.9 0.3 0	00%	2052 2.33 0.28 0.28	0 0.3 0.3	0.0
	2051 1.4 0.5 0.2	11.4 3.0 0.3 0	000	2051 2.4 0.2 0.2	11.4 3.0 0.3 0	0.0
	2050 1.5 0.5 0.2	12.1 3.3 0.4	0.00	2050 2.6 0.2 6.2	12.1 3.3 7.#7 0.4 240 .0491273	0.00
	2049 11.6 0.6 0.2	13.0 3.5 0.4 0.4 GC/C#6,7 2.308001	0.0	2049 2.7 0.9	13.0 3.5 0.4 0.4 3C/C#5,6 6C/ 2.3080801 1.	0.1 0.0
	2048 1.7 0.6 0.2	13.8 3.7 3.7 0.4 0.4 0.4 1.269444	000	2048 2.9 0.2	13.8 3.7 3.7 0.4 0.4 0(240 1.269444 :	000
	2047 1.9 0.6 0.2	14.8 4.0 0.5 0.5 3C/C#3,4 G4 2.7927769	0.00	2047 3.1 1.1 0.3	14.08 5.06 60	0-0 0-0
Case (1	2046 2.0 0.3 0.3	15.8 4.2 0.5 0	0.0 0.0 0.0	Case 3	15.8 4.2 4.2 0.5 3C/C#3 1.5360273	0.00
	2045 2.1 0.3	16.9 4.5 0.6 P5,GC#1,2 720 5.06889		2 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	16.9 4.5 6C/C#1,2 6C/C#1,2 3.37926	000
	2044 2.2.3 2.2.3 2.6.3 2.5.3 2.5.3 2.5.3 2.5.3 2.5.3 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.4 4 2.5.5.4 2.5.5.5.4 2.5.5.4 2.5.5.4 2.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5	18.6 4.8 0.6 Phully#4 240 1.858593	500 000 000	2044 3.88 3.8 1.3 0.4	18.0 4.8 4.8 0.6 7buily#5 G(1.858593	000

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		2025 8.5 2.2 2.2	61.0 15.9 4.2 0	1.1 0.1 0.1	2025 4.9 2.6	60.8 15.8 4.2	0.00
		2024 9.1 3.1 2.4	65.1 17.0 4.6 Phuky#4.5 480 25.007365	1.2 0.1 0.1	2024 14.9 5.2 2.8	64.9 16.9 4.6 4.6 1.5 240 12.503684	0.1
		2023 9.7 3.3 2.6	59.6 18.1 5.0 7hully#3 240 13.754053	1.2 0.1 0.2	2023 15.9 3.1 3.1	69.4 18.1 5.0 FhuMy#3,4 F 27.508106	1.100.0
۲		2022 10.4 3.5 2.9	74.3 5.5 7	0.1	2022 17.0 5.9 3.4	74.1 19.3 5.5 P	1.1 0.2 0.2
		2021 11.1 3.8 3.2	79.4 20.6 6.1	1.4 0.1 0.2	2021 18.1 3.8 3.8	79.1 20.6 6.1	0.2
		2020 4.1 3.55	84.7 22.1 6.7	1.5 0.1 0.2	2020 19.4 4.1	84.5 22.0 6.7	1.3 0.2
	(2014 - 2060)	2019 12.6 3.8	90.5 7.4	0.1 0.2	2019 7.2 4.6	80.2 7.4 7.4	0.14
	ost (2014	4.5 4.6 4.6	96.7 25.2 8.1	1.7 0.1 0.3	2018 7.7 5.0	96.4 25.1 8.1	0.150.31
	Variable cost	2017 14.4 5.0 4.7	103.2 26.9 8.9		2017 23.6 5.5 5.5	102.9 26.8 8.9 8.9	0.10
	Υ	2016 15.4 5.3 5.1	110.2 28.7 9.8	0.7 0.3 0.3	2016 8.8 6.1	109.9 28.6 9.8	0.17
		2015 16.4 5.7 5.6	117.7 30.6 10.8	2.1 0.3 0.3	2015 26.9 9.4 6.7	117.4 30.6 10.8	0.180.3180.318
	:	discounted 2014 17.5 6.0 6.2	125.7 32.7 11.9	2.2 0.5 4	discounted 2014 28.8 10.0 7.3	125.3 32.6 11.9	100 824
	:	not discoun 2013 125.9 43.4 45.8	903. 3 235. 1 88. 0	16.1 1.3 2.8	ot discoun 2013 206.6 71.9 54.3	900.6 234.5 88.0	13.7 2.8 2.8
		. :			23th June not discoun 2013 206.6 71.9 54.3		
	-	1993 YF 262.9 90.5 67.4 420.8 64.8	1885.9 490.7 129.3 2506.0 176.1	33.5 2.8 4.1 40.5 3208.1	1993.0 431.3 150.1 79.8 661.2 87.9	1880.1 489.6 129.3 2499.0 175.7	28.7 2.4 4.1 35.2 3459.1
	Updated 23th June 1995	fuel (MES\$) O&M(V) O&M(F) Total T.P.Replace	fuel (MUS\$) 03M(Y) 03M(F) Total T.P.Replace	fuel (MCS\$) OBM (Y) OBM (F) Total Gr. Total	fuel (MUS\$) O&M(V) O&M(F) Total T.P. Replace	fuel (MUS\$) OAM (Y) DAM (F) Total T.P.Replace	fuel (MUS\$) 084 (Y) 084 (F) 16tal 6r. Total
	Updated 23tl	Case-SL/GS North	South	Central	Case-SS/GS North	South	Central
	C	\mathbf{i}			(

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	2043 2.6 0.9 0.4	18.7 4.9 0.7 240 2.0444523	000	20 2.4 0.5 2.3 3 3	18.6 4.8 0.7 5.01 480 4.0889046	800 000
	2042 2.8 0.4 0.4	0 87 0 87 0	0.0	2042 4.6 0.5 0.5	0 19 0 19 19 19 19 19 19 19 19 19 19 19 19 19	0.0
	2041 3.0 1.0 0.5	21.3 0.9 0.9	0.0	2041 4.9 1.7 0.6	21.2 5.5 0.9	000
	2040 3.2 1.1 0.5	22.8 5.9 1.0	000 000	2040 5.2 0.6 0.6	22.7 5.9 1.0 0	0.0
	2039 3.4 0.6	24.3 6.3 1.1 0	000 400	2039 5.6 0.7	24.2 6.3 1.1	400
	2038 3.6 1.2 0.5 Q.Ninh#5578 20,578818	25.9 6.8 1.2 0al#17 375 5.1447045	0.05	2038 5.9 2.1 2.1 1.7 1125 15.434114	25.9 6.7 1.2 0al‡17 5.1447045	400 400
·	2037 3.9 0.7	27.7 7.2 1.3 1.3 1.3 1.25 16.977525	0.0	533 533 553 563 563 57 57 57 57 57 57 57 57 57 57 57 57 57	27.6 7.2 1.3 0al#14-16 C 1125 16.977525 :	000 400
	2036 4.1 0.8	29.6 7.7 1.5 1.5 0al#12-14 C 1125 18.675277	0.00	2036 6.3 0.9 .9	29.5 7.7 1.5 1.5 0al#11-13 C 1125 18.675277	000 *000
	2035 4.4 0.8	31.6 8.2 1.6 0al#8-11 1125 20.542805	0.0 0.1	2035 7.2 7.2 2.5 1.0 0.Ninh#7 6.8476017	31.5 8.2 1.6 Coal#8-10 Ct 20.542805 1	0.5
	2034 4.7 0.9	33.8 8.8 1.8 1.8 7.5 15.064724	0.1	2034 7.7 2.7 1.1 0	33.7 8.8 8.8 1.8 0al#6,7 750 15.064724 2	0.0
	2 2033 5.0 1.7 1.7 2.Ninh#4 2.Ninh#4 375 8.2855981	0 0 1 0 1 0 1 0	0.6	2033 8.2 1.2	35.8 9.4 9.4 1.9 0al#4.5 750 16.571196	0.5 0.1
	2032 5.4 1.1 1.1 0	1 38.5 7 10.0 4 2.1 Coal≢2−5 1500 0 36.456631	0.1	2032 8.8 3.1 1.3 1.3 1.25 27.342474	38.4 10.0 2.1 Coal#2,3 18.228316	0.0
	2031 5.7 2.0 1.2 Q.Ninb#2, 3 750 20.051147	41.1 10.7 2.4 0	0.1	0 2031 2032 9.4 8.8 5 3.3 3.1 6 0.Ninh#4.3 20.051147 27.342474	41.0 10.7 2.4 0 C	0.6 0.1 0.1
	2030 6.1 1.3 1.3	43.9 11.4 2.6 Joal#1 375 11.028131	0.1	10.203	43.8 11.4 2.6 Coal#1 375 11.028131	0.7 0.1 0.1
	2029 6.5 6.5 1.5 1.5 0.Ninb#1 375 12.130944	46.9 2.8 2.8	811	2029 10.7 3.7 1.8 1.8 2. Ninh#1 375 12. 130944	46.7 12.2 2.8 C	0.1
e (0)	2028 7.0 2.4	50.1 13.0 3.1	0.9 0.1 0.1	1.9	49.9 13.0 2.1	8.00
Case	2027 7.55 1.88 1.88	53.5 13.9 3.4	0.1	Case 2027 2.1 2.1	13.0 2.5 4	000 000
	2026 8,70 2,27 2,27 2,27	57.1 14.9 3.8	0.1 0.1 0.1	2026 4.5 2.3 2.3	56.9 3.88 3.88	0.9 0.1 0.1

		,					
		2060 XF 0.3 0.1	6.1 1.6 0.1 0.1 Coal#8-11 1.8960187	0.00	2060 1.4 0.5 0.1 2.1 2.1 0.5 375 0.6320062	6.1 1.6 0.1 Coal#8-10 1.8960187	0.0
		2059 0.9 0.1	6.5 1.7 0.2 Coal#6,7 Coal#6,7 1.3904137	0.0	2059 1.5 0.1 0.1	6.5 1.7 0.2 0.2 Coal#6,7 150 1.3904137	# 00 00
		2058 3.0 0.3 0.1 0.1 0.1 Q.Nich#4 375 0.7647275	0 780	0.0 0.0	2058 1.6 0.1	t 6.9 1.8 2 0.2 2 Coal#4,5 C 750 3 1.5294551	0.0
		2057 1.0 0.4 0.1 0.1 0.	7.4 1.9 0.2 0.2 1500 3.3648012	0.0	2057 1.7 0.6 0.6 0.1 1.1 2.5236009	7.4 1.9 0.2 0.2 Coal#2,3 750 1.6824006	0.0
		2056 1.1 0.4 0.1 0.1 750 1.8506407	0 8-70 08-70	0.0	2056 1.8 0.6 0.1 0.1 0.1 1.8506407 1.8506407	0 C C C C	0.0
		2055 1.2 0.4 0.1 0.1 0	8.5 2.2 0.2 0.2 Coal#1 375 1.0178524	0.0	2055 1.9 0.1 0.1 0	8.5 2.2 0.2 0.2 1.0178524	0.0
·		2054 1.3 0.4 0.1 0.1 0.1 0.1 0.1 1.1196376	0	0.00	2054 2.1 0.7 0.2 0.2 Q.Ninh≇1 375 1.1196376	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00.0
		2053 1.3 0.5 0.2 0.2	0 558 0	0.0	500 500 500 500 500 500 500 500 500 500	0 5.5 0.3 2.6	0.00
		2052 1.4 0.5 0.2	10.3 2.7 0.3	000	2052 2.4 0.2	10.3 2.7 0.3	220
		2051 1.5 0.2 0.2	11.0 2.9 0.3	0.0	2051 2.5 0.2 0.2	11.0 2.9 0.3 0	9.0
		2050 1.6 0.2 0.2	11.8 3.1 0.4	000	2050 2.7 0.9 0.2	11.8 3.1 0.4 0	0.0
		2049 1.8 0.6 0.2	12.6 3.3 0.4	0.0 0.0	2049 0.3 0.3	12 9,5 0 4 0	0.0 0.0 0.0 0.0
	·	2048 1.9 0.6	13.4 3.5 0.5	0.000.0	2048 3.1 0.3 0.3	0 3.5 0.5 0.5 0	0.00
		2047 2.0 0.7 0.3	14.4 3.7 0.5	0 0 0 0 0 0 0	2047 3.3 1.1	14.3 3.7 0.5	0.00
	(2) (2)	2046 2.1 0.3 0.3	15.3 4.0 0.6	0 000 000	Case 4	15.3 4.0 0.6	
		2045 2.3 0.3 0.3	16. 2.4.0 6.6	0.03 0.03	2045 3.7 0.4	16.4 0.4 0.6 0.6	000 000
		2044 2.4 0.4	17.5 17.5 4.6 0.7 4.6 10.7 480	3.717186 0.3 0.0	2044 4.0 1.4 0.4	17.4 4.5 4.5 0.7 PhuMy#5 240	0 0 0 0 0 0 0 0 0 0 0
	e Na series	4	P4				

2024 2023 3223 3.9	1 66.5 1 17.8 6 4.2 7 4.2 7 17.8 240 0 240 3 12.503684	5 1.4 0.1 2 0.1	3 2024 3 2024 3 10.5 3 3.9	1 65.6 2 17.1 8 5.2 8 7.40 0 12.503684	00.1 0.1 0.1
2023 32.02 4.3 4.3	71.1 19.1 4.6 PhuMy#3 240 13.754053	1.5	2023 32.0 11.3 4.3	70.1 18.2 18.2 5.8 75.8 75.0 13.754053	0.1
2022 34.1 12.0 4.8	75.9 20.4 5.1	1.6 0.1 0.2	2022 34.2 4.8	74.8 6.3 6.3	1.6 0.1 0.2
2021 36.4 5.2 5.2	81.0 21.7 5.6	1.7 0.1 0.2	2021 36.5 5.2	79.9 7.0	1.7
2020 38.9 5.8	880 833 9 9 8 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9	0.28	2020 39.0 5.8 5.8	85.4 7.7 7.7	1.8 0.2 0.2
14-2060) 2019 41.6 14.6 6.3	92.4 24.8 6.8	1.8 0.2 0.2	2019 41.6 6.3 6.3	91.2 23.7 8.5	0.2 0.2 0.2
cost (201. 2018 2018 15.6 7.0	98.7 26.5 7.5	2.1 0.2 0.3	2018 15.5 7.0	97.≰ 9.3 9.3	0.2
Variable ²⁰¹⁷ 47.4 16.6 7.7	105.4 28.3 8.2	0.2 0.3 0.3	2017 47.5 16.7 7.7	104.0 27.0 10.2	305
2016 50.6 17.8 8.4	112.6 30.2 9.0	0.22 0.33 0.33	2016 50.7 8.4 8.4	111.0 28.9 11.2	6.3 0.3 0.3
ed 2015 54.1 19.0 9.3	120.2 32.3 9.9	352 0.52	84.15 94.15 99.15 99.15	118.6 30.8 12.4	2.5 0.3 0.3
discounted 2014 57.7 20.3 10.2 10.2	128.4 34.4 10.9	2.7 0.2	discounted 2014 57.8 20.3 10.2	126.6 32.9 13.6	00.2
21th June not discoun 2013 2013 414.9 145.7 75.5	922.6 247.5 80.9	19.4 1.5 2.8	21th June not discoun Year 2013 15.4 146.2 75.5	909.9 236.7 100.7	19.2 1.6 2.8
21th June Year		*	21th June Y		
Base 1993. 0 866. 2 304. 2 111. 0 1281. 3 119. 8	1926.1 516.7 118.9 2561.7 190.2	40.5 3.3 4.1 48.0 4201.0	Dune 1995 DM=Base 1993.0 867.3 867.3 110.9 110.9 1283.4 1283.4	1899.5 494.1 148.0 2541.7 187.8	40.2 3.3 3.3 4.1 4183.6
OI) W/O SonLa (GL) DM=Base North fuel (WUS4) 18 North fuel (WUS4) 2044 (V) CM4 (V) 2044 (F) 1 Total 11 T.P.Replace 1	fuel (MUS\$) O&M(V) O&M(F) Total T.P.Replace	fuel (MUS\$) O&M(Y) O&M(F) Total Gr. Total	Created 19 June 1995 W/O SonLa (GS) DM=Base North fue(MCS\$) DM=7933. North fue(MCS\$) 305. OMM(Y) 305. OMM(F) 110. Total 123. T.P.Replace 123.	fuel (MUS\$) OMM(Y) OMM(F) Total T.P. Replace	fuel (MUS\$) OMM(V) OMM(F) Total Gr.Total
W/O Sonl North	South	Central	W/0 SonL North	South	Central
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2043 Yr	8 0 0 0 0 7 0 7 0 7	0	19.1 5.1 0.7 Phuky#3	44 523	0.0 0.0		2043 YY 8.6 3.0 0.6	•	18.8 4.9 9 0.9 10.9	240 0444523	400
2042	0.32	Ģ	20.4 5.5 0.8 Phul	2.0	00.4 00.0		2042 9.2 0.7		20.1 5.2 0.9	0 2	400°
2041	8 4 8 8 4 8	0	21.8 5.8 0.8	0	0.00		2041 9.8 0.8		21.5 5.6 1.0	0	0.5
2040	3.7	0 ,	8.2 0.6 0.6 0.7	•	000		2040 3.7 0.9		22.9 6.0 1.1	0	0.0
2030	11.2 3.9 0.8	0	24.8 5.7 1.0	0	0.00		2039 3.9 0.9		24.5 6.4 1.3	0	0.0
9006	4.2 4.2 4.2 1.0 0.1.13-15	1125 15. 434114	26.5 7.1 1.1 Coal#10-12	1125 15 ,4 34114	0.0 0.0		2038 11.9 4.2 1.0 0.N.#13-15	1125.434114	26.1 6.8 1.4 1.4	15.4	0.0 0.0
1000	203/ 12.7 4.5 1.1 1.1	750 11.31835	28.3 7.6 1.2 Coal#6-9 C		900 000		2037 12.7 4.5 1.1 Q.Ninh#12 (375 5.659175	27.9 7.3 1.5	22.6367	0.00
	2036 13.6 1.3 1.3	0	30.2 8.1 1.3 1.3	125	0.0			750 12.450185	29.8 7.8 1.7	125 125 18.675277	0.0 0.0
	2035 14.5 5.1 1.4 1.4	20.542805	32.3 8.7 1.5	750	0.7 0.1		2035 14.5 5.1 1.4 Q.Ninh#9		31.8 8.3 1.8		0.1
	2034 15.5 5.4 1.5 0 Ni.th 7	-	34.5 9.2 1.6		0.1		2034 15.5 5.5 1.5 0.Ninh#6-8	22		15. Coa	0.1
	2033 16.6 5.8 1.7	4. MIRLES 375 8. 2855981	36.8 9.9 1.8	0	0.1 0.1	•	2033 16.6 5.8 1.7 0.Ninh#5	, «ó		Coal#4	
	2032 17.7 6.2 1.8	Q. NIDD#4 375 9. 1141579	39.3 39.3 10.5 2.0	0	0.1 0.1 0.1		2032 17.7 6.2 1.8	Ö	38.8 10.1 2.4	Coal#	-
	2031 18.9 6.6 2.0	Q. Nimh#2, 3 750 20 051147		0	0.9		2031 - 18,9 6.7 2.0 2.0			Coal#	
	2030		44.8 2.4		0.1		2030 20.2 7.1 7.1	750 750 750	j _:		000
<u> </u>	2029 21.5 7.6 2.4	Q.Ninh#l 375 11 1000141	47.9 47.9 12.8 2.6	5.C/G	4		02 2029 7.6 7.6	975 375 12 130044			0.10
Case - 01	2028 23.0 8.1 2.7		51.1 13.7 2.9	5/C/C/	-		Case - 02 2028 23.0 8.1 8.1		50.4 13.1 3.6		1.1 0.1
	2027 24.6 8.6 3.0		54.6 14.7	/C#3	9.3942031 1.1 0.1 0.1		2027 24.6 8.7 3.0		23.9 14.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2 1.1 0.1 1.0
	26.2 9.2 9.2	5	58.3 15.6 2	6. C/C#2 240	10.333623 1.2 0.1 0.1		2020 25.23 3.29 3.23		57.5 15.(4	1.2

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2.8 1.0 0.1 0.1 2.N.8-10	1125	6.2 1.7 0.1 750 1.2640125	0.0		2060 2.8 ' 1.0 0.1 0.1 2.Ninh#9 375	0.6320062	6.2 1.6 0.2 0.2 1.25 1125 1.8960187	0.0
	750 1.3904137	01.8	0.0		2059 3.0 1.1 0.1 0.1 2.Ninh#6-8 (2.0856206	6.6 1.7 0.2 0.2 Coal#7,8 (750 1.3904137	0.0
3.2 1.1 0.2 2.Ninh#5 {	375 0. 7647275	7.1 1.9 0.2	0.0		2058 3.2 1.1 0.2 0.2 2.Ninh#5 (2.2)	0.7647275	7.0 1.8 0.2 0.2 Coal#4.5 (750 1.5294551	0.0
3.4 1.2 0.2 0.Ninh#4	375 0.8412003	7.6 2.0 0.2	0.0		2057 3.4 1.2 0.2	0	7.5 1.9 0.2 0.2 750 1.6824006	0.00
		8 0.2 0.2	0.0		2056 3.7 1.3 1.3 0.2 0.2 0.2	0.9253203	8.0 2.1 0.2 Coal#1 375 0.9253203	0.000.000
3.0 0.7 0.8	0	8.7	000		2055 3.8 1.4 0.2 0.2 0.2 0.750	2.0357047	ດ ທີ່ ດີ ດີ ທີ່ ດີ	000
4.2 1.5 0.2 2.Ninh#1	375 1.1196376	522 573 573 573 573 573 573 573 575 575 575	0.0		2054 4.2 1.5 0.2 2.Ninh#1	1.1196376	0,00	000
4.4 0.2 0.2	0	9 2 2 9 9 2 9 9 2 9	0.0		2053 4.5 0.2 0.2		9.7 2.5 0.3	0.0
4.7 1.7 0.3	0	10.8 0.3 0.3	000		2052 4.8 1.7 0.3		10.4 2.7 0.4 0	000
5.1 1.8 0.3	0	11.3 3.0 0.3	000 000		2051 5.1 1.8 0.3		11.1 2.9 0.4 0	0.02
5.4 0.3 0.3	0	12. 3. 0. 5/C#9,1 48 2.098254	000		2050 5.4 1.9 0.3		11.9 3.1 0.4	000
5.8 0.4 0.4	0	2.9 3.4 9.4 801	000 000		2043 5.8 0.4 0.4		12.7 3.3 0.5	0.0
6.2 0.4	0		000		2048 6.2 0.4 0.4		13.5 3.5 0.5 0	0.0
0 17 9 19 19 19 19 19 19 19 19 19 19 19 19 1	0	14.7 3.9 0.5 GasC/C#3 1.3963884	0.0		2047 6.6 0.4		4 4 8 0 0 0 0 0 0 0 0	000 000
2.5	0	15.7 4.2 0.5 0.5 1.5360273	800 00 00 00	ase - 02	2046 7.1 2.5 0.5		15.4 0.6 0.6 0	000
2.5	Û	16.7 4.5 0.6 7.80, 1 3.37926	4.00 4.00	Ü	2045 7.5 0.5 0.5		16.5 4.3 0.7 0.7 240 1.68963	0.0
0.000	0	17.9 4.8 0.6 PhuMy#4 240 1.858593	0.0		2044 8.0 0.5		17.6 4.6 0.8 0.8 Phully#4 1.858593	+00 000
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

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2025 12.4 3.0 3.0	75, 2 20, 0 4, 6 45, GC#2, 3 480 22, 733972	0.9 0.1 0.1	2025 17.7 6.2 3.0	75.1 20.0 4.6 GC/C#2,3 22.733972	0.10
2024 4.7 3.3	80.3 21.3 5.1 P5,GC#1 P5 480 25,007369 2	0.9 0.1 0.1	2024 6.6 3.3	80.2 21.3 5.1 75,GC1 G 480 25.007369	0.1
2023 5.0 3.6 3.6	85.7 22.8 5.6 75.6 240 13.754053 13.754053 240	0.1	2023 7.1 3.6	85.6 22.8 5.6 5.6 10.124053 13.754053	1.1 0.1 0.2
2022 15.1 5.3 4.0	91.6 24.3 6.2 6.2 70 240 15,129458	1.1 0.1 0.2	2022 21.5 7.5 4.0	91.4 91.4 24.3 6.2 6.2 7 7 7 7 10.4 240 15.1 29458	1.1 0.1 0.2
2021 16.2 5.7 4.4	97.8 26.0 6.8 Ph	0.1	2021 23,0 8,1 4,4	97.7 26.0 6.8 P1	1.2 0.2
2020 17.3 6.1 4.8	104.4 27.8 7.5	1.2 0.1 0.2	2020 24.5 4.8	104.3 27.7 7.5	1.3 0.2
2019 5.55 ♦ 9 5.55	111.5 29.7 8.2	1.3 0.1 0.2	26.19 56.2 56.2 56.2 56.2 56.2 56.2 56.2 56.2	111.4 29.6 8.2	0.1
2018 6.9 5.8	119.1 31.7 9.0	1.4 0.1 0.3	28.0 28.0 5.8 5.8	119.0 31.6 9.0	1.5 0.1 0.3
2017 21, 0 7, 4 6, 4	127.2 33.8 9.9	1.5 0.3 1.5	2017 23.9 6.4 6.4	127.0 33.8 9.9	1.6 0.1 0.3
2016 7.8 7.0	135.8 36.1 10.9	0.16 0.3 16	2016 31.9 11.2 7.0	135.7 36.1 10.9	1.7 0.1 0.3
2015 24.0 7.7	145.1 38.6 12.0	0.1	2015 34.1 12.0 7.7	144.9 38.5 12.0	0013
discounted 2014 25.6 9.0 8.5	154.9 41.2 13.2	00 4 8 8 8 8	discounted 2014 36.4 12.8 8.5	154.7 41.1 13.2	0.1.0
discour 2013 184. 1 64. 5 62. 8	1113.1 296.0 97.8	13.2 1.1 2.8	c discoun 2013 261.4 91.8 62.8	1111.8 295.6 97.8	14.0 1.2 2.8
27th June not discoun Year 2013 184.1 64.5 62.8			27th June mot discoun 文モムア 2013 561.4 91.8 62.8		
DM=High 2 1993 1993 184.4 134.7 92.2 611.4	91.8 2323.8 618.0 143.8 3085.6	238. U 27. 5 2. 3 33. 9 4. 1 33. 9	DM=High 1993.0 1912 - 1912 1912 - 1912 1925 - 5 829.5		235.1 29.1 2.4 4.1 35.7 4283.1
al (MUS\$) (V) ((F) Total	T.P.Replace fuel (MUS\$) OMM (V) OMM (F) Total	T.P. Replace fuel (MUS\$) OMM(V) OMM(F) Total Gr. Total	el (MUS\$) M(Y) M(F) Total	T.P.Replace fuel (MUS\$) 04M (V) 08M (F) Total	T.P. Keplace fuel (MUS\$) 0&M (Y) 0&M (F) Total Gr. Total
S Case-SL/GL North fu	South	Central	Case-SS/GL North fu	South	Central
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	2043) 3.8 3.8 3.8 3.8 3.8 3.8 3.8 3.8 3.8 3.8	23.0 6.1 6.1 0.8 Pbulby#4 240 2.0444523	000	2043 0.194 0.19	23.0 6.1 0.8 7nulty#4 2.0444523	000
	2042 4.1 0.6	24.6 6.5 0.9 Phuky#3 E 2.2488975	0.000	2042 5.8 0.5	24.5 6.5 0.9 PhuMy#3 240 2.2488975	000
	2041 4.3 1.5 0.6	26.3 7.0 1.0 0	000 000	2041 2041 0.6	26.2 7.0 1.0 P	0.0
	2040 4.6 1.6 0.7	28.0 7.5 1.1	000	2040 6.6 0.7	28.0 7.4 1.1 0	0.0 0.0
	2039 5.0 0.8 0.8	28.0 8.0 1.2 0	000 400	2039 2.5 0.8	29.9 8.0 1.2 0	• • • •
	2038 5.3 1.9 0.9 0.9 2.250 30.868227	32.0 8.5 1.3 1.3 Coal#12-14 1125 15.434114	0.0 0.0 0.0	2038 7.5 2.6 0.9 0.9 1125 1125 114	31.9 8.5 1.3 1.3 Coal#14-16 1125 15.434114	*00 000
	2037 5.6 2.0 0.8 0.8 0.8 0.8 0.8 0.0 375 5.659175	34.1 9.1 1.5 1.5 1.5 Coal#9-12 1500 222.6367	4.00	2037 8.0 2.8 0.9 0.9 0.9 0.1 375 5.659175	34.1 9.1 1.5 1.5 Coal#10-13 1500 22.6367	000 000
	2036 6.0 1.0 1.0	36.5 9.7 9.7 1.6 Coal#6-8 1125 18.675277	400°	2036 8.6 3.0 3.0 1.0 0.1 0.1 0,0 375 6.2250925 6.2250925	36.4 9.7 1.6 Coal#7-9 1125 18.675277	000
	2035 6.4 1.1	38.9 10.4 1.8 1.8 Coal#4-6 20.542805	0°1 0°1	2035 9.1 3.2 1.1	38.9 10.3 1.8 Coal#4-6 1125 20.542805	0.00
	2034 6.9 1.3 1.3	41.6 11.1 2.0 2.0 Coal#2,3 750 15.064724	0.5	2034 9.8 9.8 3.4 1.3 1.3 0.Niph#7 7.5323619	41.5 11.0 2.0 2.0 0al#1-3 1125 22.597086	0.0
	2033 7.3 2.6 1.4 Q.Ninh#5 8.2855981	44.4 11.8 11.8 2.2 2.2 Coal#1 375 8.2855981	305 305 305	2033 10.4 3.7 1.4 0.Nimh#6 8.2855981 8.2855981	44.4 11.8 2.2	0.00.000
	2032 7.8 2.7 2.7 1.5 Q.Ninh#4 9.1141579	47.4 12.6 2.4	0.0 0.1 0.1	2032 11.1 3.9 1.5 Q.Ninh#4,5 750 18.228316	47.4 12.6 2.4	0.00
	2031 8.4 2.9 1.7 Q.Ninh#3 0.Ninh#3 10.025574	50.7 13.5 2.6	0.0	2031 11.9 4.2 4.2 1.7 1.7 375 375 025574	50.6 13.5 2.6	9.00 0.1.0
	203 9. (1. 1 2. Ninb#2 37 11. 02813	54.1 14.4 2.9	900 110	203 12. 4. 1. 0. Ninh#2 377 11. 02813	54.0 14.4 2.9	0.7
	2029 9.6 3.3 3.3 3.3 2.0 2.Ninh#1 375 12.130944	57.8 15.4 3.2		2029 13.6 4.8 2.0 2.0 375 12.130944	57.7 15.3 3.2	0.7 0.1 0.1
e D	2028 3.6 2.2 2.2	61.7 16.4 3.5	ee ()	2028 14.5 2.2 2.2	61.6 16.4 3.5 GC/C#7 240 8.5401847	0.1 0.1 0.1
Case	2027 10.9 3.8 2.5	4 65.9 7 17.5 2 3.8 6C/C#6,7 7 18.788406	0.1 0.1 Case		65.8 17.5 3.8 17.5,6 18.788406	0.0.0
	2026 11.6 2.7 2.7	70.4 18.7 18.7 4.2 GC/C#4.5 480 20.667247	000 1128	2026 16.5 2.8 2.8 2.8	70.3 18.7 4.2 6C/C#4 6 10.333623	0.9 0.1 0,1

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	2060	7.5 2.0 0.2 0.2 0.2 1125 1.8960187	0.00	2060 1.8 0.6 0.1	7.5 2.0 0.2 0.2 0.2 1125 1.8960187	000	
	2059	8.0 2.1 0.2 0.2 Coal#2,3 1.3904137	0.0	2059 1.9 0.7 0.1 0.1 0.1 375 0.6852069	8.0 2.1 0.2 0.2 Coal#1-3 1125 2.0855206	0.0	
	7 2058 1.4 0.5 0.5 0.5 0.1 0.1 0.1 375 3 0.7647275	8.6 2.3 0.2 0.2 Coal#1 0.7647275	0.0	2058 2.0 0.7 0.7 0.1 0.1 0.1 0.7547275	800 000 000 000 000	0.0	
	2057 1.5 0.5 0.1 0.1 0.1 0.8412003	C 5575 0576 0576 0576 0576 0576 0576 0576	0.0	2057 2.2 0.8 0.1 1750 824006	9.40 9.40 0	0.1 0.0	
·	2056 1.6 0.6 0.2 0.2 Q.Ninh#3 Q 0.9253203	0.2	0.0	2056 2.3 0.8 0.8 0.8 0.8 2.0 1.6 1.0 2253203 1.6	0 7008	0.0 0.0	
	2055 1.7 0.6 0.2 0.2 375 375	10.5 2.8 0.3	0.0	2055 2.5 0.9 0.9 0.1 0.2 0.2 1.0178524	10.4 2.8 0.3 0	0.0 0.0	
	2054 1.8 0.6 0.2 0.Ninh#1 Q.Ni 1.1196376 1.0	11.2 3.0 0.3	0.0	2054 2.6 0.9 0.1 0.2 0.8 0.1 10.2 1.1196376	11.2 3.0 0.3 0	0.0	
	6 502 503 503 503 503 50 50 50 50 50 50 50 50 50 50 50 50 50	11.9 3.2 0.3	0.0	2053 2.8 0.2 0.2 0.2	11.9 3.2 0.3	0.0 0.0	
	2052 2.1 0.7 0.2	12.7 3.4 0.4	0.00	2052 3.0 1.0	12.7 3.4 0.4	0.0	
	2051 2.3 0.8 0.2	13.6 3.6 0.4	0.02	2051 3.2 0.2	13.6 3.6 0.4	0.000	
	2050 2.4 0.8 0.3	14.5 3.9 9.4	0.0	2050 3.4 1.2 0.3	14.5 3.9 0.4	0.0	
	2049 2.6 0.3 0.3	15.5 4.1 0.5	0.0	2049 3.6 0.3	15.5 4.1 0.5	0.0	
	2048 2.7 1.0	16.6 4.4 0.5	0.0	2048 3.9 1.4	16.5 4.4 4.4 0.5 6C/C#7 240 1.269444	0.0	
2	2047 2.9 0.4	17.7 4.7 4.7 0.6 3C/C#6.7	0.0	2047 4.2 0.4	17.7 4.7 0.5 0.5 6C/C#5,6 62/C#5,6 62/C#5,6 480	0.00	
Case (Ð,	2.0/20240 0.0 0.0	Case 2046 4.4 0.4	18.9 5.0 5.0 0.6 0.6 GC/C#4 G	0.0	
	2041 2041 2.2.3 2.4	20.2 5.4 0.7 P5,GC#2,3 CC		2045 4.7 0.4	20.2 5.4 5.4 1.0 7 480 7 2,3 2,3 2,3 2,3 2,3 2,3 2,3 2,3 2,3 2,3	0.0	
	2044 3.6 1.2 0.5	21.6 5.7 0.8 P5,0C#1 P5	3.717186 0.0 0.0	2044 5.1 1.8 0.5	21.5 5.7 5.7 0.8 P5,GC1 480	0.0 0.0 0.0	
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2025 12.6 3.0	73.5 19.1 5.2	1.5 0.1 0.1	2025 17.2 6.0 3.0	73.4 19.0 5.2	0.110
2024 13.5 3.3 3.3	78.5 20.4 5.7	1.6 0.1 0.1	2024 5.5 3.3	78.4 20.3 5.7 0	0.1
2023 14.4 3.6 3.6	83.9 21.8 6.3 6.3 480 480 27.508106	1.7 0.1 0.2	2023 6.9 3.6	83.7 21.7 6.3 6.3 480 27.508106	1.8 0.1 0.2
2022 15.4 5.4	89.6 23.2 5.9 6.9 15.129458	1.8 0.1 0.2	2022 7.4 4.0	89.4 23.2 6.9 15.129458	0.20
2021 5.7 4.4	24.8 24.8 7.6 Pt	1.9 0.2 0.2	2021 7.9 4.4	95.5 24.8 7.6 PT	0.2
2020 17.5 6.1 4.8	162.2 26.5 8.3	007 007 0	2020 23.9 8.4 4.8	102. D 26. 4 8. 3	0022
2019 18.7 5.3 5.3	109.1 28.3 9.2	2.2	2019 25.6 9.0 5.3	108.9 28.2 9.2	0023
2018 7.0 5.8	116.5 30.2 · 10.1	8999 8999 8999	2018 27.3 5.8 5.8	116.3 30.2 10.1	0.3
2017 21.4 7.4 6.4	124.5 32.3 11.1	9 9 9 9 9 9 9 9 9 9 9 9	2017 29.1 10.2 6.4	124.2 32.2 11.1	2.7 0.3 0.3
2016 22.8 8.0 7.0	132.9 34.5 12.2	5.0 0.7 0	2016 31.1 10.9 7.0	132.6 34.4 12.2	2.9 0.3 0.3
2015 24.4 8.5 7.7	141.9 36.8 13.4	3338	2015 33.2 7.7 7.7	141.6 36.7 13.4	3.0 0.3 0.3
discounted 2014 26.0 9.1 8.5	151.6 39.3 14.8	0.3	discounted 2014 35.5 12.5 8.5	151.3 39.2 14.8	000 000
ot discoun 2013 187.0 65.2 62.8	1089.2 282.6 109.2	21.5 1.8 2.8	ot discoun 2013 255.1 89.5 62.8	1086.8 281.9 109.2	23.4 1.9 2.8
23rd June not discoun YEAT 2013 187.0 65.2 62.8	·		24th June not discoun 文化ない 2013 255.1 255.5 62.8 62.8		
DM=High 1993.0 390.4 136.0 92.2 618.7	100.1 2273.8 589.9 160.5 3024.2	45.0 3.7 4.1 52.9 4013.6	DM=High 1993.0 532.6 186.8 92.3 811.7 107.0	2268.9 538.5 160.5 3017.9 208.5	48.9 4.0 4.1 56.9 4203.0
el(MUS\$) M(Y) M(F) Total	T.P.Replace fuel (MUS\$) O&M(V) O&M(F) Total	fuel (MUS\$) 64M(Y) 05M(Y) 05M(F) Total Gr. Total	el (MUS\$) M(V) M(F) Total	fuel (MUS\$) O&M(Y) O&M(F) Total T.P.Replace	fuel (MUS\$) ObM (V) OAM (F) Total Gr. Total
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-	- •	22.5 5.8 5.8 0.9 4.0 480 480 480	0.0 0.0	049 0-1-0 0-1-0 0-1-0 5-0 5-0 5-0 5-0 5-0 5-0 5-0 5-0 5-0 5	0 880 0.880	0.0
0,00	2042 4-1 0-5 0.5	24.1 6.2 1.0 2.2488975 4	0.00	2042 2042 0.6 0.6	24.0 6.2 1.0	0.000.000
	44. 44. 30. 30. 30. 30. 30. 30. 30. 30. 30. 30	25.7 6.7 1.1 1.1 74	0.00	2041 6.0 0.6	25.6 6.6 1.1	0.0
	2040 4.7 0.7 0.7	27.4 7.1 1.2 0	0.0	2040 6.4 0.7	27.4 7.1 1.2	900 000
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	2038 5.4 1.9 1.9 0.9 1. Ninh#9-12 1500 20.578818	31.3 8.1 1.5 Joal#20-22 1125 15.434114	0.000.1	2038 7.3 2.6 0.9 0.9 375 5.1447045	31.2 8.1 1.5 CL#20-22 15.434114	0.1
	2037 5.7 2.0 0.9 0.9 1.Ninh#8 0.9 5.659175	33.4 8.7 8.7 1.6 1.6 1.6 1.6 1.0 1500 1500 22.6367	0.1	2037 7.8 2.7 2.7 0.9 0.9 375 5.659175	33.3 8.6 8.6 1.6 1.6 1.6 22,6367	0.1
	2036 6.1 2.1 1.0 2.1 1.0 2.1 1.0 2.5 375 6.2250925	35.7 9.3 1.8 0al#13-15 Co 1125 18.675277	0 - 0 - 0	2036 8.4 8.4 2.9 1.0 1.0 1.0 750 12.450185	35.6 3.2 3.2 1.8 1.3 1.3 1.8 1.675277	0.0
	2035 6-51 1-1-2 2035	38.1 9.9 2.0 201#10-12 C 20.542805	001 100 100	2035 8.9 3.1 1.1 1.1	38.0 9.9 9.9 2.0 2.0 1500 1500 27.390407	0.1 0.1
	2034 7.0 2.4 1.3 1.0000 2.1 1.3 2.15 375 7.5323619	40.7 10.6 2.2 Coal#8.9 (15.064724	000	2034 9.5 3.3 3.3 1.3 Q.Ninh#7,8 750 15.064724	40.6 10.5 2.2 Coa#18 7.5323619	0.9
	2033 7.5 7.5 1.4	43.5 11.3 2.4 2.4 Coal#6.7 16.571196	0.0	2033 10.2 3.6 3.6 1.4 0.Nimh#6 8.2855981	43.4 11.2 2.4 Coal#6,7 16.571196	0-9 1-0 1-0
	2032 8.0 2.8 1.5 0. Nimh#5 9.1141579	46.4 12.0 2.7 Coal#4.5 18.228316	6 	2032 10.9 3.8 3.8 1.5 0. Nimh#5 9. 1141579	46.3 12.0 2.7 2.7 30al#4,5 18.228316	1.0 0.1 0.1
	2031 8.5 3.0 3.0 1.7 1.7 1.7 1.0 375 10,025574	49.6 12.9 2.9 2.9 2.9 2.9 2.9 12.9 2.9	1.00 1.00	استحاد مددا		1.1 1.0
	2029 2030 9.7 9.1 3.4 3.2 2.0 1.18 2.0 Ninh#1,2 Q.Ninh#3 (24,261785 11,028131	52.9 13.7 3.2 Coal#1,2 22.056262	0.1 0.1	2030 2031 2030 2031 1.4 1.1 4.4 4.1 1.8 1.1 2.8 0.Nimh#2 2.05525 10.02575	52.8 13.7 3.2 Coal#1 375 11.028131	1.1 0.1 0.1
ര	2029 9.7 3.4 2.0 2.0 7.0 750 24.261888	56.5 14.7 3.5	1100 1100	2029 13.2 4.5 2.0 nh#1 375 130944	56.4 34.6 3.5 5	0.1
case 6	2028 3.6 2.2	60.4 35.7 3.9	0.1 0.1 0.1 0.1	2028 14.1 5.0 2.2 2.2	60.3 3.6 3.9	1.3 0.1 0.1
	2027 11.1 3.9 2.5	64.5 16.7 4.3	1.3 0.1 0.1	2027 15.1 2.5	64.3 16.7 4.3	1.4 0.1 0.1
	2026 11.8 4.1 2.7	68.9 17.9 4.7	1.4 0.1 0.1	2026 16.1 5.7 2.7	68.7 17.8 4.7	1.5 0.1 0.1

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	2060 1.3 0.4 0.1	7.4 1.9 0.2 0.2 1.25 1.25 1.8960187	0.00	2060 1.7 0.6 0.1	7.3 1.9 0.2 0.2 Coal#9-12 1500 2.5280249	0.0
	2059 1.4 0.5 0.5 0.6952069	Coal#8.9 Coal 7.8 Coal#8.9 Coal 750 1.3904137 1.8	000	2059 1.8 0.6 0.6 0.1 0.1 0.1 1.3904137	7.8 2.0 0.2 0.2 0.2 Coa#18 375 0.6952069	0.0
	2058 1.4 0.5 0.1	8.4 2.2 0.2 0.2 1.5294551	0.0	2058 2.0 0.7 0.1 0.1 0.1 0.1 0.1 7.1 7647275	8.4 2.2 0.2 0.2 Coal#6,7 1.5294551	000
	2057 1.5 0.5 0.1 0.1 Q.Ninh#5 0.8412003	9.0 2.3 0.2 0.2 Coal#4,5 C	0.0 0.0	2057 2.1 0.7 0.1 375 412003	9.0 2.3 0.2 0.2 Coal#4.5 L.6824006	0.0
	2056 1.6 0.6 0.5 0.5 0.8 1.0.9253203 0.8	9.6 2.5 0.3 0.3 Coal#3 7.5 0.9253203	0.0	2056 2.2 0.8 0.2 0.92 0.9253203 0.8	9.6 2.5 0.3 0.3 Coal#2,3 C Coal#2,3 1.8506407	0.0
	2055 1.8 0.6 0.2 0.2 0.2 1.0178524	10.2 2.7 0.3 2.0357047	0.00	2055 2.4 0.8 0.2 0.2 Ninh#2,3	10.2 2.6 0.3 0.3 0.3 0.3 1.0178524	0.0
	2054 1.9 0.7 0.2 0.2 Q.Ninh#1,2 750 2.2392752	0 0 0 0 0 0 0 0 0 0	0.00	2054 2.6 0.9 0.2 0.2 1.1196376 2	0 0 0 0 0 0 0	0.00
	2053 2.0 0.2 0.2 0.2	11.7 3.0 0.4 0	000	2053 2.7 0.2 0.2	11.6 3.0 0.4 0.4	000
	2052 2.1 2.2 2.2 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	12.5 3.2 0.4	002	2052 2.9 0.2 0.2	12.4 3.2 0.4	0.03
	2051 2.3 0.8			2051 3.1 1.1 0.2	13.3 3.4 0.4	0.03
	2050 2.4 0.9 0.3	14.2 3.7 0.5	0.0	2050 3.3 1.2 0.3	14.2 3.7 0.5	0.0
	2049 2.6 0.9	0 23 0 23 0 2		2049 3.6 0.3 0.3	15. 1 3. 9 0. 5 0	0.0 0.0 0.0
	2048 2.8 1.0 0.3	16.2 4.2 0.5 0		2048 3.8 1.3 0.3	16.2 4.2 0.6	0.03
	2047 3.0 1.0 0.4	17.3 4.5 0.6		2047 4.1 1.4 0.4	17.3 4.5 0.6	0.0 0.0
Case 6	2046 3.2 1.1 0.4	18. 0.4.0 7.8 5 0.	••••• •••••		18.4 4.8 0.7 0	0.0 0.0
	2045 3. 4 1. 2 0. 4	19.7 5.1 0.8	0.4 0.0 0.0	2045 4.6 1.6 0.4	19.7 5.1 0.8 0.8	0.0
	2044 3.6 1.3 0.5	21.1 5.5 0.8	*00	2044 4.9 1.7 0.5	21.0 5.5 0.8 0	0.0 0.0 0.0

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2025 4.4 2.6	60.8 15.8 4.2 240 11.366986	0.9	2025 17.2 6.0 3.2	60.7 15.8 4.2	0.1
2024 13.4 4.7 2.8	64 - 6 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9	1.0 0.1 0.1	2024 18.4 5.4	64.8 16.9 16.9 4.6 14.6 240 12.503684	0.1
2023 14.3 5.0 3.1	59.3 18.0 5.0 5.0 27.508106 27.508106	0.10	2023 19.6 3.8 3.8	69.3 18.0 5.0 5.0 3000743,4 480 27.508106	1.1 0.2
2022 5.3 3.≰	74.0 5.5 Ph	1.1 0.1 0.2	2022 20.9 4.2	74.0 5.5.0 19.5	0.1
2021 16.3 3.8 3.8	79.0 20.6 6.1	0.1	2021 22.4 7.5 4.6	79.0 20.6 6.1	1.2 0.1 0.2
2020 17.4 6.1 4.1	84.4 22.0 6.7	0.1	2020 23.9 8.4 5.1	84-4 22.0 6-7	1.3 0.1 0.2
2019 1.5.6 4.6	90.2 23.5 7.4	1.4 0.1 0.2	2019 9. 6 5. 6	90.1 23.5 7.4	1.4 0.1 2
2018 5.9 5.9	96.3 25.1 8.1	1.5 0.1 0.3	2018 3.6 6.2	96.2 25.1 8.1	1.5 0.3 0.3
2017 21.2 5.5 5.5	102.8 26.8 8.9	1.6 0.1 0.3	2017 29.1 10.2 6.8	102. 8 26. 8 8. 9	1.6 0.1 0.3
2016 7.9 6.1	109.8 28.6 9.8	1.7 0.1 0.3	2016 31.1 7.5	108.7 28.6 9.8	1.7 0.1 0.3
2015 24.2 6.7 6.7	117.3 30.5 10.8	1.8 0.1 0.3	2015 33.2 11.7 8.2	117.2 30.5 10.8	1.8 0.2 0.3
discomted 2014 25.9 9.0 7.3	125.2 32.6 11.9	00.28	discounted 2014 35.4 12.4 9.1	125.2 32.6 11.9	0.2 0.4
t discoun 2013 185.8 64.7 54.3	899.8 234.3 88.0	13.6 1.1 2.8	t discoun 2013 254.6 87.0	899.2 234.2 88.0	13.9 2.8 2.8
277th June not discoun 2013 アピスト 185.8 84.7 54.3			26th June not discoun 26th グビルド 2013 254.6 89.4 67.0		
	91.4 1878.6 489.2 129.3 2497.1 2497.1	28.4 2.4 34.9 34.0 3401.4	1993.0 531.5 186.6 98.5 816.6	110.4 1877.3 488.9 129.3 2495.5 175.7	29.1 2.4 4.1 35.6 3634.0
GS (2009) fuel (MUS4) otati(F) otati	T.P.Replace fuel (MUS\$) OMM(Y) OMM(T) Total	fuel (MIS\$) 6481(Y) 0481(F) 0481(F) fotal Gr. Total	GS (2009) fuel (MUS\$) 0&M(F) 0&M(F) Total	T.P.Replace fuel(MUS\$) OAM(F) OAM(F) Total T P. Renlace	fuel (MUS\$) 08M(Y) 08M(F) 08M(F) Ctal Gr. Total
(G) Case-SL/GS (2009) North fuel (MIS4) CAM(F) CAM(F)	South	Central 1	(D) Case-SS/GS (2009) North fuel (MUS\$) OMM (F) Total	South	Central
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	2043 3.8 0.5 0.5	18, 6 4, 8 0, 7 7hully#3, 4 4, 0889046	003	2043 5.3 0.6 0.6	18.6 4.8 0.7 hu lly# 3,4 480 4.0889046	0.0
	2042 4.1 0.5	0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50	000 000	2042 5.6 0.6	19 0.70 8 70 19 19	000
	2041 4,4 1.5 0.6	21.2 5.5 0.9	000 000	2041 6.0 2.1 0.7	21.2 5.5 0.9 0	0.0
	2040 4.7 0.6	22.7 5.9 1.0	000 000	2040 5.4 0.8 0.8	22.6 5.9 1.0 0	400 400
	2039 5.0 0.7 0.7	24.2 6-3 1.1	0.0 0.0	2030 0.84 0.84 0.84 0.84 0.84 0.84 0.84 0.8	24.2 6.3 1.1	00°0
	2038 5.3 1.9 0.7 2.Ninh#9,10 750 10.289409	25.8 6.7 1.2 1.2 Coal#17 375 5.1447045	000 400	2038 7.3 2.6 0.9 1.0 0.9 1125 15.434114	25.8 6.7 1.2 5.0al#17 5.1447045	
	2037 5.7 5.7 2.0 0.8 0.8 375 5.659175	27.6 7.2 1.3 Coal#14-16 1025 16.977525	0.0 0.0	2037 7.8 2.7 2.7 1.0 4.Ninh#9, 1 750 11.31835	27.5 7.2 1.3 0al#14-16 1125 16.977525	*00°0
	2036 6.1 0.9	29.5 7.7 1.5 0al#11-13 C 1125 18.675277	0°0 0°0 0°0	2036 8.3 2.9 1.1	29.5 7.7 1.5 ioal#11-13 C 1125 18.675277	0.0
	2035 6.5 1.0	31.5 8.2 8.2 1.6 Coal#9,10 13.695203	0.5 0.1 0.1	2035 8.9 3.1 1,2	31.5 8.2 1.6 .0al#8-10 20.542805	0.5
	2034 6.9 1.1	33.6 8.8 1.8 1.8 1125 2.597086	0.0	2034 9.5 3.3 3.3 1.3 0.Ninh#8 7.5 7.5323619	33.6 8.7 8.7 1.8 Coal#6,7 15.064724	0.5
	2033 7.4 2.6 1.2 0. Ninh#6, 7 750 16.571196	35.9 9.4 1.9 Coal#4.5 16.571196	000	2033 10.2 3.6 1.5 0.Ninh#6,7 750 16.571196	35.9 9.3 1.9 Coal#4.5 (16.571196	0.0 0.1
	2032 7.9 2.8 1.3 Ninh#4,5 750 8.228316	38.3 10.0 2.1 al#2,3 8.228316	0.00	2032 10.9 3.8 1.6 1.6 750 750 228316	38.3 10.0 2.1 Coal#2.3 18.228316	001 000
	0 2031 0 8.5 1 2.9 6 0.Ninh#3 0. 375 0.	41.0 10.7 2.4	0000	2031 1.1.6 4.1 4.1 0.Ninh#3.8 0.Ni 10.025574 18.3	40.9 10.7 2.4	0.10
	2030 9.0 3.1 1.6	43.7 11.4 2.6 Coal#1 375 11.028131	0.11	2030 2.4 2.9 2.0 2.0 2.0	43.7 11.4 2.6 Coal#1 375 11.028131	0.7 0.1 0.1
	2029 9.6 3.4 1.8 1.8 Q. Ninh#1, 2 750 24, 261888	46.7 2.8 2.8	0.0 0.1 1	2029 13. 2 4. 6 2. 2 Q. Nimh‡1, 2 750 24. 261888	46.7 2.2 2.8 2.8	0.00
ر م	2028 10.3 3.6 1.9	49.9 33.0 3.1		2028 5.0 2.4	49.0 3.1 3.1	0000 811
Case	2027 11.0 3.8 2.1	13.9 23.9 4	°	2027 15.1 2.5 2.6 2.6	53. 2 13. 9 3. 4	000 011 000
	2026 11.7 4.1 2.3	56 14.8 3.8 8	0.19	2026 16.1 5.7 2.9	55 14.5 3.8 8 8 8 8	0.19

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	2060 1.3 0.4	6.1 1.6 0.1 0.1 750 1.2640125	~ Q Q Q Q Q	2060 1.7 0.5 0.1	6.1 1.6 0.1 0.1 Coal#8-10 1.8960187	0.0
-	2059 1.3 0.1	6.5 1.7 0.2 0.2 2.0al#6-8 1125 2.0856206	- C C C C C	2059 1.8 0.6 0.1 0.1 375 0.6952069	6.5 1.7 0.2 Coal#6.7 (1.3904137	0.0
	2058 1.4 0.5 0.1 1.Ninh#6,7 750 1.5294551	6.9 1.8 0.2 Coal#4,5 C 1.5294551	0.0	2058 2.0 0.7 0.1 0.1 0.1 1.5294551	6.9 1.8 0.2 0.2 20a1#4.5 750 1.5294551	0.0
÷.	2057 1.5 0.5 0.1 0.1 1. Ninh#4,5 750 1.6824006	7.4 1.9 0.2 Coal#2,3 (1.6824006	0.0	2057 2.1 0.7 0.2 2.Ninh#4,5 1.6824006	7.4 1.9 0.2 0.2 Coal#2,3 1.6824006	0.0
	2056 1.6 0.6 0.1 0.1 0.1 375 0.9253203	02.19	999 199	2056 2.2 0.8 0.2 0.2 0.2 0.2 0.2 0.2 0.225203	2.1 0.2	0.0
	2055 1.7 0.6 0.1	8.5 2.2 0.2 20al#I 375 1.0178524	0.0	2055 2.4 0.2 0.2	8.4 2.2 0.2 Coal#1 375 1.0178524	0.0
	2054 1.9 0.6 0.2 0.2 1.Ninh#1,2 750 2.2392752	0770 0770 07970	0.00	2054 2.6 0.9 0.2 0.2 1.Ninh#1,2 750 2.2392752	0 0 0 0 0 0 0 0 0 0 0	0.1 0.0
	2053 2.0 0.7 0.2	0.00 0.00 0.00	0°01 0°01	2053 2.7 0.2 0.2	9 2 6 0 79 6	0.0
	2052 2.1 0.7 0.2	10.3 2.7 0.3	0.0 0.0	2052 2.9 0.2 0.2	10.3 2.7 0.3	000
	2051 2.3 0.2 0.2	11.0 2.9 0.3	0.000.000	2051 3.1 1.1 0.3	11.0 2.9 0.3	0.0
	2050 2.4 0.2	11.7 3.1 0.4	0.0	2050 3.3 1.2 0.3	11.7 3.1 0.4	0.00
	2040 2.46 0.99 0.39	12.5 3.3 0.4	000	20 20 20 20 20 20 20 20 20 20 20 20 20 2	12.5 0.4 0.4	000
	2048 2.8 1.0	13.4 3.5 0.5	0.0	20 20 20 20 20 20 20 20 20 20 20 20 20 2	າ. ເດີຍ ເດີຍ ເດີຍ ເດີຍ ເດີຍ ເດີຍ ເດີຍ ເດີຍ	0.000.000
	2047 3.0 1.0 0.3	14.3 3.7 0.5	0.03	2047 4.0 1.4	14.3 0.5 0.5	0.0
() () () () () () () () () () () () () (2046 3.2 0.3 0.3	15. 2.0.3 0.0		2046 2046 0.4 1.5 5.4 0.4	15.3 4.0 0.6	000
Case	2045 3.4 0.4 0.4	16.3 4.2 4.6 0.6 240 1.68963	0.00	Case 2045 1.6 0.5	16.3 4.2 0.6	0.0
	2044 3.6 0.4	17.4 4.5 7 17		2044 4.9 1.7 0.5	17.4 4.5 0.7 Phuły#5 1.858593	000

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		20 0 7 7 0 7 7		60.5 15.7	4.0 bu lt y#5 240	11.366386	2.4 0.2	
	2024	16.3 2.6 2.6		64.6 16.8	4.4 PhuMy#3,4 P 480	25.007369	0.26	5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	2023	17.4 5.9 2.9		68.9 17.9		0	2.7	5
	2022	18.0 3.3 3.2		73.6 19.1	5.3		2 0 2 0 2 0 2 0	2
	2021	19.9 3.5 3.5	-	78.6 20.4	5° 8		3°1 0°3 1	4
	2020	21.2 7.2 3.8		84.0 21.8	6.4		8 8 8 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8	**>
	2019	22. 7 7. 7 4. 2		89.7 23.3	7.0		3.5	7.0
14-2060)	2018	24. 2 8. 2 4. 5		95.8 24.9	7.7		ຜ ຕ ຄ ຕໍ່ ຕໍ່ ຢ	с • п
Variable cost (2014-2060	2017	25.9 8.8 5.1		102.3 26.6	8.5		0.00 *00	2
Variable	2016	27.6 9.4 5.6		109.2 28.4	9.4		40	° • •
		29.5 10.0 6.2		116.7			40.0	ς, υ υ
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	1963. 0	472.4 160.7 73.6 706.7	75.6	1869.0 485.4	123.1 2477.5	159.0	73.9 6.2	4.1 84.1 3503.0
) Case-SS/GS, L0LP=3. 0%	fuel (MUS\$) O&M (V) O&M (F) Total	T. P. Replace	fuel (MUS\$)	Ocu (F) Total	T.P.Replace	fuel (MUS\$) 04M (V)	OMM(F) Total Gr. Total
	Case-SS/	North		South		•	Central	
: (€	÷				:		

	2043 YP 4-7 1.6 0.4	18.5 2.4 2.5 2.5	0.1 0.0
	2042 5.0 1.7 0.5	19.8 5.1 0.8	0.1 0.0
	2041 5.3 0.5 0.5	21.1 5.5 0.9	0.1
	2040 5.7 0.6	22.52 5.9 0.9	0.9 0.1 0.0
	2039 6.1 0.6	24.1 6.3 1.0	0.1
	2038 6.5 2.2 2.7 0.7 2.Ninh#8,9 750 10,289409	25.7 6.7 6.1 1.1 1.1 al#15,16 0.289409	1.0 0.1 0.0
	2037 6.9 2.4 0.8 3.Ninh#7 Q. 5.659175 1	27.5 7.1 1.3 1.3 20al#12-14 Cc 1125 16.977525 1	0.0
	2036 2.5.4 0.2.5.7 0.2.2 0.2.5 0.2.5 0.2.5 0.2.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0	29.3 7.6 1.4 Coal#9-11 Coal: 1125 18.675277 16.9	1.2 0.1 0.0
	2035 7.9 2.7 0.9 Q.Ninh#6 375 6.8476017		1.2 0.1 0.1
	2034 8.5 2.9 1.0 2.Ninh#5 2.Ninh#5 7.53Z3619	33.5 8.7 8.7 1.7 Joal#5,6 750 15.064724	1.3 0.1 0.1
	2033 9.0 1.1	35.7 9.3 9.3 1.9 Coal#4 (8.2855981	1.4 0.1
	2032 9.6 3.3 1.2 Q.Ninh#4 9.1141579	38.2 9.9 2.0 Coal#2,3 18.228316	1.5 0.1 0.1
•	130 2031 2032 1.0 10.3 9.6 3.7 3.5 3.3 1.5 1.0 1.2 1.5 1.1 1.2 1.5 1.2 3.3 1.5 1.1 1.2 1.5 1.1.4 1.4 1.5 1.1.4 1.2 1.5 1.1.4 1.2 1.5 1.1.4 1.2 1.5 1.1.4 1.2 1.1.14 1.1.14 1.14	40.7 10.6 2.2 Coal#1 10.025574	1.6 0.1 0.1
	2030 11.0 3.7 1.5 1.5 0.Nink#1 375 11.028131	43.5 11.3 2.5 0	1.7 0.1 0.1
	2029 11.7 4.0 1.6	46.5 12.1 2.7 0	0.2
	2028 12.5 1.8 1.8	49.6 12.9 3.0	0.20
Case (1)	2027 13.4 4.6 2.0	53.0 3.8 0 3.9 0	2.1 0.2 0.1
ပို	Year 2026 14.3 2.2 2.2	56. 14.7 3.7 6	0.22

	-		
	2060 \/ 1.5 0.5 0.1 0.1 0.1 0.5320062 0.5320062	6.1 1.6 0.1 0.1 Coal#7,8 750 1.2640125	000
	2059 1.6 0.6 0.1 0.1 2.Nimh#5 0.6952069	6.5 1.7 0.2 0al#5,6 1.3904137	0.0
	2058 1.7 0.6 0.1	6.9 1.8 0.2 0.2 0.15 0.7647275	000
	2057 1.9 0.6 0.1 0.1 Q.Ninh#4 0.8412003	7.4 1.9 0.2 0.2 0.2 0al#2,3 C 1.6824006	000
	2056 2.0 0.7 0.1 0.1 0.1 750 1,8506407	7.9 2.0 0.2 0.2 0.2 Ccal#1 (375 0.9253203	0.00
	2055 2.1 0.7 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	800 700	0.0
	2054 2.3 0.8 0.8	0.23 0.23 0.23	00.0 • 0
	2053 2.4 0.2 0.2	9.26 9.26 9.26	₹00 000
	2052 2.6 0.2 0.2	10.2 0.3 0.3	0.0 0.0
	2051 2.8 0.9 0.2	10.9 0.38 0.38	0.0 4.0
	2050 3.0 0.2 0.2	11.7 3.0	0.00.0
	2049 3.2 0.2 0.2	12.5	000
	2048 3.4 0.3 0.3		0.0
	2047 1.2 0.3	14.2 3.7 0.5	0.0
	2046 7.3.8 0.3	15. 2.0 5.0	0.6
Case (1)	2045 4.1 0.45	16.2 4.2 0.6 0.6 Phully#5 1.68963	0.6 0.1 0.0
Ö	Year 2044 4.4 1.5 0.4	17.3 4.5 0.6 PhoMy#3,4 480 3.717186	0.1 0.0

CHAPTER 10

A

POWER SYSTEM EXTENSION PLAN

POWER SYSTEM EXTENSION PLAN CHAPTER 10

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CHAPTER 10 POWER SYSTEM EXTENSION PLAN

10.1 Power System Planning in the Fourth Master Plan Study

Particulars of the 220kV system extension plans for transmission lines and substations of cach region of northern, southern and central in the fourth M/P are presented in Tables 10.2 through 10.7, together with proposed additions and revisions in this study according to the results of the power system analysis.

10.2 Power System Analysis

(1) Methods of Power System Analysis

The power systems of the overall Vietnamese 500/220kV transmission networks in 2000, 2005 and 2010 were analyzed with power flow calculation.

(2) Conditions of the Analysis

- Assumed power systems: The 2000 and 2005 power systems were basically based on the power systems in the fourth M/P, with some proposed modifications according to implementation schedules of power projects. The proposed 500kV systems are added as deemed necessary in the study. The 2010 power system was composed by adding 500kV and 220kV systems as deemed necessary according to the results of power flow calculations.
- Substation loads: In chapter 5 of Vol II, Annex 5, only sales energy in GWh of each province was estimated. The MW demand of each province at the 220kV buses was obtained by assuming the load factor of each region and T&D loss up to the 220kV outgoing points. The 220kV substation loads were estimated for the base case scenario taking into account local conditions.

Assumed outputs of power stations connected to the 110kV system such as Thac Ba, Thac Mo, Buon Coup, etc. were deducted from the estimated 220kV loads. The estimated substation loads of all the substations of each region are tabulated in Table 10.1.

• Assumed load power factor: Power factor of all the substation loads was assumed to be 90% at the outgoing points from 220kV buses.

• Maximum transformer capacity: The transformer capacity of substations in the Hanoi and Ho Chi Minh areas is estimated to grow large in near future. An appropriate maximum demand of one substation is assumed to be 400 to 450MW with two 250MVA units or four 125MVA transformers. In the power flow analysis, allocation of load was assumed only at the existing and planned substation sites. Construction of new substations was also judged necessary and taken into account in estimating necessary fund for future extension.

Power sources: Locations and output of new power stations were determined according the result of the power development study of this M/P study for the Son La small and gas small (Case SS/GS) development case. The power flow analyses were conducted for the cases of rainy season, when hydropower plants are fully operated, and of dry season, when thermal power plants are fully operated. The maximum sending out power was assumed to be 95% of the rated output for hydropower plants and 90% of the rated output for thermal power plants.

(3) Results of Power Flow Calculations

The results of power flow calculations were drawn for each of northern (Figures 10.1 to 10.4), southern (Figures 10.5 to 10.8) and central power systems (Figures 10.9 to 10.12) as per attached.

(4) Findings in Power Flow Calculations

Findings from the results of power flow studies are mentioned below:

- (a) Northern System
 - The 220kV system extension plan in the fourth M/P up to 2005 seems to be prepared with enough allowance and basically no addition will be required except the followings up to 2010. Comments on the extension plan up to 2010 are mentioned below:
 - Second circuit is required for the section of Nho Quan Ninh Binh Nam Dinh Thai Binh Hai Phong in the period of 2000 to 2005 due to implementation of Ban Mai in 2004. In future after 2010, this system will require reinforcement by feeding the 500kV power at around Nam Dinh. The second circuit of the Hoa Binh Nho Quan line, which is at present connected to the Thanh Hoa line, shall be connected to this line.
 - Installation of the Ha Tinh 500/220kV transformer is required just after 2000 to attain stable operation of the 220kV system extended to Dong Hoi. In relation to these developments, the second circuit shall be strung on the existing double circuit towers of the Thanh Hoa - Vinh - Ha Tinh section.
 - The construction schedules of the second Pha Lai Hoang Bo line and Ban Mai Vinh line were shifted from 2001 2005 to 2006 2010 based on the power development plan.
 - For delivery of the Dai Thi power, two single circuit lines, Dai Thi to Yen Bai and to Thai Nguyen, were taken into account.
 - When the 500kV Hanoi north substation starts its operation near Da Phuoc, the 220kV Da Phuoc - Chem line is recommended to be constructed
 - For power supply to the Hanoi area, one additional substation will be required around the year of 2010.

For delivery of the Son La power, the 500kV system is surely required. The power plant is more than 250km away from the major demand centers of Hanoi and Hai Phong. Therefore, the 220kV system is not appropriate to send the generated Son La power. The 500kV system up to 2010 was planned from the following considerations:

- For connection with the 220kV system at the Son La site one 500/220kV transformer is required.
- For delivery of the Son La power, two 500kV lines are considered, one toward the south of Hanoi and the other toward the north side, forming a loop circuit by connecting both at Hai Phong. Two circuit line is considered between Son La and Hoa Binh south and single circuit lines for all the other sections.
- The second circuit will be necessary for the Hoa Binh south Hanoi south -Hai Phong section when the Son La and Huoi Quang projects are fully developed and demand of the Hanoi and Hai Phong areas grows further.
- A switching substation is planned to the south of Hoa Binh for connection with the existing line. The existing Hoa Binh substation site is not suitable for large extension due to limitation of available land. Three transformer stations for stepping down to 220kV are taken into account. In the system analysis, substation locations are assumed at Mai Dong (south of Hanoi), at Da Phuoc (north of Hanoi) and at Hai Phong.
- 500kV connection to Nam Dinh will be required after 2010 when maintenance of the normal supply voltage only by the 220kV double circuit line becomes difficult around this point.
- 500kV system extension to Hoang Bo had better be studied in case that the thermal development in the Quan Ninh area exceed the 1500MW level.

(b) Southern System

In the southern system, demand is heavily concentrated in the Ho Chi Minh area. Together with Dong Nai province, this area has consumed approximately two thirds of all consumption in the southern system. Due to large growth in demand, careful study is required in estimating future power flow. Many existing facilities will require reinforcement or replacement by 2010 due to large growth in power flow. Major comments to the 220kV system are as follows:

As very large development is planned at the Phu My and Phan Thiet (4,200MW in total by 2010), large power flow is expected in the section of Phu My - Cat Lai - Thu Duc. Conductors not smaller than 2 x 330 sq. mm seems advisable.

- The power to Tao Dan in the center of Ho Chi Minh city had better be sent from Cat Lai instead of the planned Phu Lam. The power flow in this area is always from Cat Lai to Phu Lam and supply from Phu Lam will increase construction cost and power loss, and cause larger voltage drop.
- The 220kV line to Bac Lieu shall be originated from Thot Not instead of the planned Rach Gia. The 220kV line between Thot Not and Rach Gia will be heavily loaded and the direction of power flow on this line is always from Thot Not to Rach Gia and not suitable for further loading the load of Bac Lieu line.

- The planned conductor size of the Omon Thot Not line, 2 circuits of AC400, is clearly not sufficient. To send generation of 900MW, at least duplex conductors of AC400 are required.
- For the section between Long Binh and Bao Loc, double circuit line is required when the Dai Ninh hydropower plant is connected, and the second circuit is required when the Dong Nai 4 hydropower plant is connected. The existing line in operation since 1964 can be replaced.
- In the period of 2006 to 2010, the following three existing lines will require replacement with duplex conductor lines:
 - Long Binh Thu Duc: 2 circuits are required
 - Thu Duc Hoc Mon: Same as above
 - Phu My Long Thanh: Planned 2 circuits of AC400 do not have enough transmission capacity.
- Though details shall be further studied, for supply to the Ho Chi Minh area two additional substations will be required to meet demand up to 2010. One of these substations will be required in the city center area, most probably this station will be of GIS construction and connected with underground cables.
- One substation will be required at Tay Ninh to meet growing demand in the area. Other two substations are anticipated to be required in the period of 2006 to 2010 in the southwestern parts of the region.
- Extension of the existing 500kV system is required to secure power supply to the Ho Chi Minh area and to the Mekong delta. The 500kV system extension was assumed in this study as mentioned below:
 - Two substations were planned at Bao Loc and Cat Lai on the second 500kV line between Pleiku and Phu Lam. A 150MVA reactor was connected to the Bao Loc bus to compensate line capacity. A transformer at Bao Loc was connected in the period of 2006 to 2010, when the Dong Nai 4 hydropower plant is connected, to provide a detour route to the 220kV system in the area.
 - From Phu My, two 500kV lines, to Phu Lam and to Cat Lai, were assumed to transfer the generated power of the Phu My thermal power plant together with power from the Phan Thiet thermal power plant. A loop line system is considered between Phu My and Phu Lam to attain reliability of power transfer.
 - The 500kV extension to Thot Not will be required just after 2000. The currently planned transmission lines to Tra Noc, Thot Not and Rach Gia are not adequate to transmit the forecasted 2000 demand normally, and static capacitors of 110MVA in total will be required at Thot Not and Tra Noc to maintain the normal voltage.

For delivery of the generated power of the Phan Thiet thermal power plant, 2,100MW, a two circuit line to Phu My and a detour line to Bao loc were taken into account.

- To avoid voltage drop of the Ho Chi Minh system as a whole, it is needed to install static capacitors of approximately 300MVA in total on the tertiary windings of 500/220kV transformers. In the power flow calculation of this study, installation of static capacitors was assumed, 100MVA at Cat Lai and 150MVA at Thot Not.
- (c) Central System
 - For connection of a series of hydropower plants, cascade connection is considered for the sections of Pleiku Sesan 3 Sesan 4 hydropower plants and Pleiku Pleikrong Thuong Kontum Quang Ngai.
 - Buon Coup, Rao Quan and Son Con 2 hydropower plants are assumed to be connected to the 110kV system.
 - Situation of the power supply to Nha Trang by the planned 220kV lines from Pleiku via Krong Buk and from Da Nhim is critical in 2010. To increase power transmission capacity to meet the future demand in the area, further addition of 220kV lines will not be effective and an extension of the 500kV system by branching from the second line between Pleiku and Bao Loc is recommended. This line will be required just after 2010.

Identified Transmission System Extension Plans

220kV transmission system extension plans of this study up to 2000, 2005 and 2010 are shown in Tables 10.2 and 10.3 for the northern system, Tables 10.4 and 10.5 for the southern system, and Tables 10.6 and 10.7 for the central system. These tables indicate addition plans identified as the result of system analysis of this study together with the fourth M/P. A presumed plan of 500kV system extension is presented in Table 10.8.

The planned additions during the five year periods of 1996 - 2000, 2001 - 2005 and 2006 - 2010 of the three regions of northern, southern and central are shown in Figures 10.13 through 10.21.

10.3 110kV and Distribution Systems

It is not practical to estimate actual requirements of these items from available information, and necessary additions for each year were estimated based on the forecasted annual increment of energy sales and estimated installations for GWh sales. In decision of future requirements, not only figures of Vietnamese power system but also figures in other similar countries were taken into account.

Estimation of each item is explained below:

(1) 110kV System

Actual installations for GWh power sales as of end-1994 were calculated for each regional system from the actual quantities at the end-1994 not including private facilities and the estimated energy sales. The length of 110kV lines in circuit-km and transformer capacity in MVA per GWh sales of each system are as given below: